

Scanning - Shortwave - Ham Radio
Equipment - Computers - Antique Radio

25th
Anniversary

Monitoring Times

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VBR - A Voice for Mariners

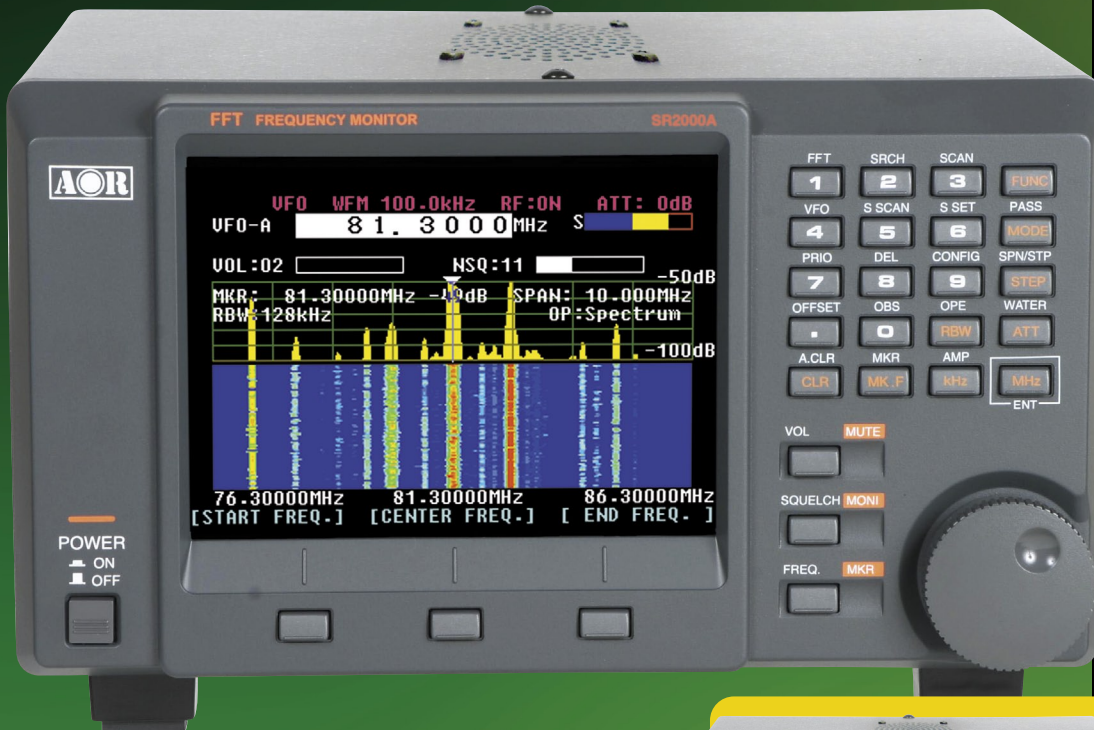


In this issue:

- The Bizarre World of Pirate Radio
- Happy Birthday, Sputnik!
- Winter-Spring Propagation Predictions
- FCC Shifts 700 MHz Public Safety Channels!

Watch What Happens!

The SR2000A is an ultra-fast spectrum display monitor that lets you SEE received signals in FULL COLOR



Using the power of FFT (Fast Fourier Transform) algorithms with a powerful receiver covering 25MHz ~ 3GHz*, the SR2000A features a color monitor that displays up to 40MHz spectrum

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Scans 10MHz in as little as 0.2 seconds! Instantly detects, captures and displays transmitted signals.



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Authority on Radio Communications

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*Government version. Cellular blocked for US consumer version.

**No audio is available when the frequency span is set to 20MHz or 40MHz.

***No audio available while displaying video signal on the LCD. If both video and audio need to be monitored simultaneously, an optional (external) TV2000 is required.

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The latest WR-G305e (USB) and WR-G305i (PCI) are the first commercially available VHF/UHF software-defined scanning receivers. Their all-mode digital demodulator works entirely in software, with easy upgradability and high performance level typical of receivers costing many times more.

Designed for demanding applications where it is important to locate even the weakest signals in background noise and extract the cleanest audio possible. Combined with excellent hardware parameters and extensive software support, the WR-G305 series defines a new standard for communications intercept and monitoring tools.

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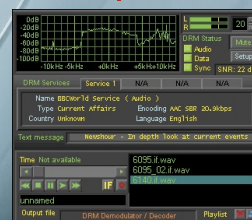
WR-G305e - portable and powerful!



WR-G305i - hides inside your PC!



Professional Demodulator Option



DRM Decoder Option



APCO P25 Decoder Option



Lead Story

VBR Prescott Coast Guard Radio

By Ron Walsh

Shipping remains very active on the St Lawrence River and the Great Lakes. When commercial vessels and private pleasure boats are mixed, marine communications are essential. The author visits VBR – one of three Canadian Coast Guard stations responsible for Great Lakes radio traffic. Much has changed on the marine channels with the advent of digital communications and satellites, but one thing remains constant: When in distress or simply in need of information, there is no substitute for the professional radio operator.

Story starts on page 12.

On our cover: The recently retired CCGS *Simcoe*. Photography by Paul Beesley of www.shipphotos.com

C O N T E N T S

The Bizarre World of Pirate Radio..... 8

By Gayle Van Horn W4GVH

If you're tired of predictable programming filling the bands 24/7, you might be ready to scout out the world of pirate radio. Pirate radio stations are illegal and unregulated broadcasters transmitting with enough power to be heard by a potential audience – whether in the next block or the next continent.

Programming can vary from juvenile off color antics to creative radio plays; from new alternative music to replays of classic rock and roll; and from fresh creative shows to endless replays of recorded pirates from previous decades. Here are some tips to find them.

Happy Birthday, Sputnik!..... 16

By Tom Kneitel

The renowned radio editor and author looks back at the event that rocked the status quo on October 4, 1957 – the launch of *Sputnik 1*. Though it was a blow to Cold War equilibrium, *Sputnik* spurred the imagination and interest of countless young men like Tom Kneitel. How many of us stood in the front yard at dusk fifty years ago to watch the first “artificial moon” passing overhead?

Propagation Outlook: Oct-Mar..... 17

By Tomas Hood

Our biannual propagation prognostication shows a bit of a change from a year ago, when we expected Cycle 24 to be starting at any time. Today, experts are not sure whether we are still in the bottom of the 23rd cycle or at the beginning of the 24th. Either way, the only way to go from here is up as sunspots increase, and that means improving conditions for AM radio. Medium wave and shortwave conditions should be substantially improved by the end of the year.

Reviews

Bottom of the line but not bottom of the barrel in HD Radio is the RADIOSOPHY HD-100. Designed to be an affordable way to get into digital radio reception, the HD-100 offers equal reception quality without all the bells and whistles (page 66).

Is radar becoming obsolete? The new RADARBOX by AirNav Systems makes it possible for anyone to see what the air traffic controllers see by decoding and displaying aircraft which are equipped with

the new ADS-B communications system (page 68).

This month *Computers & Radio* solves the problem of the missing serial port (required for radio control) in most new laptop computers, and, with the MINI USB DOCKING STATION from Cyberguys installed, *C&R* checks out eleven favorite radio programs to see how they perform with the new Windows Vista operating system (page 72).



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COMMUNICATIONS

"Communications" is compiled by editor Rachel Baughn KE4OPD (editor@monitoringtimes.com) from news and clippings sent in by our readers. Many thanks to this month's fine reporters: Anonymous, Mike Elcesin, Dave Martin, John Mayson, Jerry None, Ken Reitz, Doug Robertson, Brian Rogers, and Larry Van Horn.

FCC Reconfigures 700 MHz Spectrum

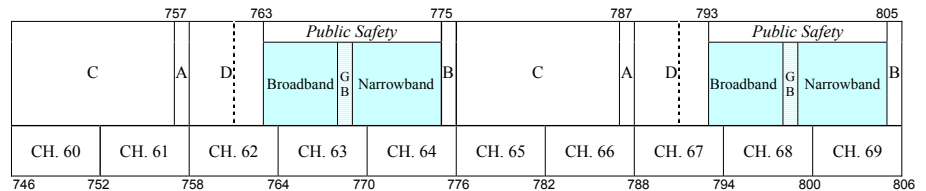
As one commentator put it, "Because the FCC giveth and then can changeth their mind," the Federal Communications Commission's Second Report and Order (FCC-07-132A1, posted in its entirety on the *Monitoring Times* website) contains several decisions with a major impact on users of the 700 MHz band. (The 700 MHz band (698-806 MHz) is television broadcast spectrum that will be made available by February 2009 for public safety and commercial wireless services as a result of the digital television transition.)

The biggest news is that the FCC has reconfigured both the commercial and the public safety portions of the 700 MHz band. Public safety users were shifted downwards by 1 MHz, and A and B block guardband assignments shift to a new location between the Upper C and D blocks. This will require relocating several existing services.

The current 700 MHz Public Safety Bandplan (see Figure 1) did not allow for broadband use. The R&O acknowledges, "The communications needs of public safety have evolved in recent years, and ... wireless broadband services will play an essential role in the ability of public safety entities, especially first responders, to fulfill their mission to protect the health, welfare and property of the public."

The reconfiguration accomplished several purposes. It protected narrowband public safety communications from potential interference, it created spectrum for the desired broadband services, and the downward shift

FIGURE 3: REVISED UPPER 700 MHz BAND PLAN INCLUDING GUARD BANDS



protected public safety narrowband operations in the Canadian border areas. The new 700 MHz Public Safety Band plan is as follows:

"The revised band plan for the 700 MHz Public Safety Band consists of a 10-megahertz block (comprised of paired 5-megahertz blocks) allocated for broadband communications at the bottom of the band (763-768/793-798 MHz), a 2-megahertz internal guard band block (comprised of paired 1-megahertz blocks) (768-769/798-799 MHz), and a 12-megahertz block (comprised of paired 6-megahertz blocks) allocated for narrowband communications at the top of the band (769-775/799-805 MHz)."

The FCC requested information regarding the number of narrowband radios currently deployed and in use by public safety agencies, but no one responded. Motorola did provide an estimate that the cost to reconfigure radios and transmitters by the time band reconfiguration would commence (approximately one year after the Commission finalizes the new band plan) to be approximately \$10 million. The FCC adopted that amount as a cap on projected reimbursements.

The winner of the Upper 700 MHz Band commercial D Block license (758-763 and

788-793) will be licensed on a nationwide basis and will become part of a 700 MHz Public Safety/Private Partnership. As part of the Partnership, the commercial licensee will build out a nationwide, interoperable broadband network for the use of public safety. They will also pay the costs associated with relocating public safety narrowband operations to the consolidated channels.

In order to establish a broadband standard with a nationwide level of interoperability, there will be a single nationwide Public Safety Broadband Licensee, the other party in the Public Safety/Private Partnership. Rules and responsibilities for this partnership are spelled out in this Report and Order. Under the Partnership, the Public Safety Broadband Licensee will have priority access to the commercial spectrum in times of emergency, but the commercial licensee will have preemptible, secondary access to the public safety broadband spectrum.

How does this reconfiguration affect scanner users? Scanners which include the new 700 MHz band start their coverage at 764 MHz, not 763. We're sure that scanner manufacturers will be scrambling to accommodate the new bandplan in order to satisfy their customers, many of whom are public safety volunteers themselves.

FIGURE 1: ORIGINAL 700 MHz BAND PLAN

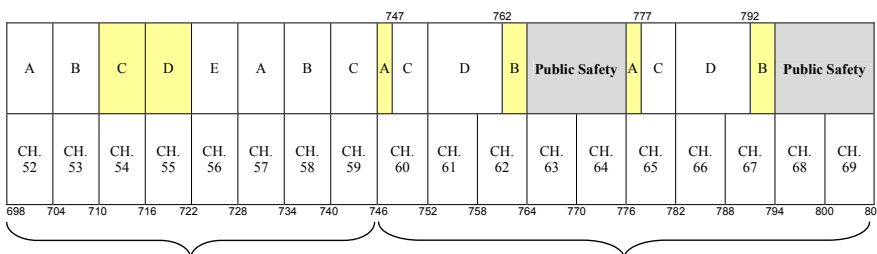
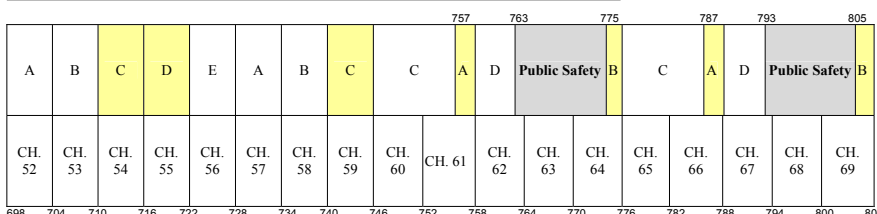


FIGURE 2: REVISED 700 MHz BAND PLAN FOR COMMERCIAL SERVICES



Broadband in the "White Spaces"

The Federal Communication Commission gave a failing grade to a prototype device that Microsoft, Google, Dell, Hewlett-Packard, Phillips, Intel and other technology companies said would beam high-speed Internet service over unused analog television channels 2-51, which are due to be opened up in early 2009. The technology companies say the unlicensed and unused TV airwaves, also known as "white spaces," would make Internet service accessible and affordable, especially in rural areas, and also spur innovation.

However, the FCC said the devices submitted by the technology coalition could not reliably detect unused TV broadcast channels, and could also cause interference. Microsoft plans to appeal the ruling, claiming the first prototype was defective. Microsoft has sub-

mitted a new model to the FCC, which it says causes no interference.

DirecTV Adopts BPL

"Satellite-television provider DirecTV announced a wholesale agreement today with Current Group to provide high-speed Internet service over electric-power lines," otherwise known as broadband over powerlines (BPL), said an August article in *The Wall Street Journal*.

This would appear to be dreadful news for hams and shortwave listeners, who have battled interference issues with several BPL providers. However, ARRL CEO David Sumner, K1ZZ, said, "There is no reason to panic [over this decision]. ARRL's only concern about BPL is the interference potential. In that regard, the approach that Current has taken to date – limiting its use of the medium-voltage lines to 30-50 MHz and using the HomePlug standard to avoid the HF ham bands on the low-voltage drop – has been satisfactory. If the FCC mandated what Current has been doing, we would be quite happy."

Sumner continued: "We can be glad that DirecTV chose to align itself with a BPL company that has taken the interference problem seriously and has a good track record of avoiding interference in the amateur bands."

Pirate Reunion

Former pirate radio DJs from illegal

1960s reunited August 9-14 to broadcast – legally, this time – off the Essex coast in Britain. More than a dozen DJs were due to board the LV18, a former lightship moored half-a-mile off Harwich, to broadcast as Pirate BBC Essex, broadcasting on 729, 765 and 1530 medium wave and at bbc.co.uk/essex

Forty years after nearly all the pirate stations went off the air, listeners again gathered on the coast, hoping to catch a glimpse of former pirate DJs like BBC Radio 2's Johnnie Walker.

Tim Gillett, of BBC Essex, said: "We did a similar thing in 2004 when we celebrated 40 years since the start of pirate radio, when pirate radio, led by Radio Caroline, broadcast off the Essex coast." This time the reunion commemorates the 40th anniversary of the Marine Broadcasting Offense Act which shut down all but Radio Caroline, which continued to broadcast in defiance of the act.

Another former DJ joining the celebration is Mike Pasternak, who now lives in Thousand Oaks, California. He's known as "The Emperor" in the United Kingdom. In France, he's "Le President," in Germany "Kaiser" and in Argentina "El Presidente."

Pasternak said, "The DJs were like rock stars. I felt like Elvis. I thrived on it." But when he returned to the U.S. in 1976 to care for his ailing father, he couldn't get a job in American radio. For the reunion, Pasternak has recorded a music single called "Pump Up the Pirates."

Books by Ernest H. Robl:

THE BASIC RAILFAN BOOK

UNDERSTANDING INTERMODAL

THE POWDER RIVER BASIN

Detailed descriptions at

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Customize your scan list's 37,800 memory channels for up to 1800 conventional or trunking entries without object limits; on-screen programming assistance; upgradable free software as available from GRE; follow trunking from Motorola, LTR, P25 9600 baud, and EDACS wide/SCAT/narrow networks in any land-mobile band; third-party-software remote controllable; tri-color LED alarm/alert custom-programmable.

Adaptive digital tracking instantly compensates for multipath or fading distortion; digital AGC provides even-level audio regardless of mode; DSP subaudible squelch in DCS and CTSS eliminates squelch tail; high-speed USB cloning; Spectrum Sweeper latches on to nearby transmissions; signal strength indicator; 4 rows of 16 characters each on high-contrast LCD display; SAME/hazards weather alert with single-button access to storm spotter frequencies.

This triple-conversion scanner has selectable 20 dB attenuation for overload situations; multiple priority channels; scan at 55 channels per second; service and frequency search at 90 channels per second; backlit LCD and keypad. Includes whip antenna, AC adaptor and manual.

PSR-500 also includes belt clip, 2 battery cases; 4 AA cells required.

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Available as a hand-held (PSR-100) or desktop/mobile (PSR-200) configuration, this low-cost scanner provides top performance at a bottom price for rural areas with traditional communications requirements. Frequency coverage 29-54, 108-174, and 380-512 MHz for land mobile and aircraft monitoring.

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PSR-100 also includes belt clip, 2 battery holders; 4 AA cells required.

* plus shipping

PSR-600



**PSR-600
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PSR-200



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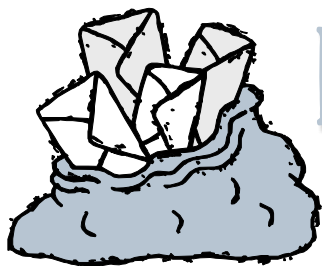
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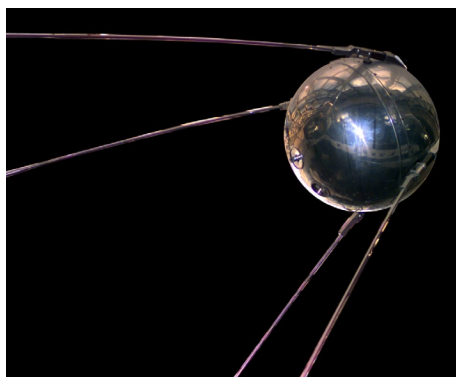
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LETTERS TO THE EDITOR

Tom Kneitel – The Write Stuff

In this October issue, we have the honor of an article by the legendary Tom Kneitel W4XAA, inspired by a QSL card he copied to Bob Grove in an email. While Tom writes to commemorate the 50th anniversary of the first earth-orbiting satellite, we thought it an appropriate time to commemorate “Tommy” himself. The following are personal testimonies to the influence of this passionate radio hobbyist by three career writers, each of whom has his own sphere of influence. Maybe this section should have been titled “Making Waves”; the ripples continue to spread...



Memories

Bob Grove W8JHD

As the fall colors begin to overtake the green of summer, it's natural to look back reflectively, and many of us look back to what got us all started in the world of radio monitoring. With me it was the miracle of hearing radio signals from great distances, then talking to them when I got my ham radio license at age 13. That was quickly followed by the intrigue of intercepting and identifying those mysterious signals outside of the broadcasting and amateur radio bands.

But early influences include people; for many of us radio old-timers, perhaps none as much as Tom Kneitel whose poignant prose filled pages of many magazines, most notably and recently, *Popular Communications* and, previously, *CB Magazine*.

Tom's loves were the sensational – pirate broadcasters, spies, UFOs, embassies, FBI, RF and the human body, death rays, “secret” frequencies. His best-selling *Top Secret Registry* of government radio frequencies was the inspiration for my



own sequential volumes of the *Confidential Frequency List*, the *Federal Frequency Directory*, and ultimately my *Shortwave Frequency Directory*.

Writing articles for technical magazines gave me the confidence to publish the first issue of *Monitoring Times*, followed shortly by *CQ Magazine's* release of *Popular Communications* – and Tom was at the helm. Readers were sure that he and I were mortal enemies; in fact, nothing could be further from the truth. Tom and I always had a warmth and respect for one another, exchanging kind comments as well as Christmas cards.

Tom's writings influenced the radio hobby, establishing precedents and standards, and I'm grateful to have had the pleasure of knowing him, maturing in my own fields of interest at his side.

Thanks, Tom, for sending the Sputnik QSL, which started this trip down memory lane.

– Bob Grove

Tom's “The Man”

Larry Van Horn, N5FPW

Back in my early days of the radio hobby (circa 1964 and after), I had a lot of guiding influences that led me through the waters of the radio hobby world. Looking in my file cabinet at articles published in *Electronics Illustrated* and *Popular Electronics* by such notables as C. M. Stanbury, Harry Helms, Steve Handler, Ron Lumachi-WB2CQM, Len Buckwalter-K1ODH/KBA4480, Jim White-W5LET, Russ Alexander-W6IEL, and Herb Friedman-W2ZLF, it brought back fond memories of the days when we called frequencies “kilocycles” and “megacycles.”

But one name, in my opinion, stands a little taller than all the rest – Tom Kneitel. While I have never met Tom in person, after more than 40 years of reading his writings, I feel like I know him very well. In fact, I will never forget our first conversation on the phone. No, I don't remember what we talked about, but heck I was talking to the “man” – Tom Kneitel.

What did Tom write about that had such an impact on a teenager just getting into the radio hobby? He wrote about the intrigue and mysteries that surrounded the radio communications of the era. Tom could spin a good tale, pass along a neat frequency and send his read-



ers running for the radio dial. Each of Tom's articles took you on an adventure. It made you want to fire off your Knight Kit Star Roamer or Hallicrafters 5-band shortwave, and see if you could get in on the action, too.

Topics like Radio Swan/Americas, the Voice of the Purple Pumpkin, and many more were the beat that Mr. Kneitel pounded. It was an era in the radio hobby I will never forget and almost single handedly Tom made that all possible.

So, for those of you who remember, here are some of the legends of an era gone by: the Heathkits, Knight kits, Hallicrafters, Lafayette radios, *EI*, *Popular Electronics* and one of the biggest legends of all – my friend Tom Kneitel. A snappy salute to you and “Alice.” Thank you for all you did for our radio hobby.

Give ‘em Flowers

T.J. Skip Arey

I think it was Ken Keasey who once said something about flowers: “Give ‘em while they can still smell ‘em!” Too many flowers show up after the people are no longer with us to appreciate them.

Now I never figured Tom Kneitel to be big on flowers, but I am going to do the next best thing. I am going to tell him how I feel while I still can.

When I first became curious about this thing called radio, I started reading a magazine in my school library called “*Electronics Illustrated*.” A number of folks were regular columnists, including such notables as the well known Wayne Green, founder of 73 Magazine. They were great role models, but when the new issue of *EI* showed up on the shelves I always turned first to “Uncle Tom's Cabin,” where Tom Kneitel gave his advice and sardonic wit to the readers. If you expressed a problem and asked “Why Me?” more often than not, Tom would return the answer “Why not you!”

But in amongst the barbs, I learned a great deal about the radio hobby, and just as importantly, a great deal about how to write about radio. Faithfully reading “Uncle Tom's Cabin” as well as his feature pieces, I began to get a sense that you could teach people about radio and have a whole lot of fun doing it. I followed Tom's writing through magazines such as *S9* and on into the venture *Popular Communications*. Tom never ceased to please.

As I began to write about radio myself,



whenever I got stuck for ideas, I would reread old copies of *EI* and Tom's other magazines for inspiration. As I began to have a bit of a name of my own in radio journalism, I took on the persona of "Uncle Skip," in honor of all that "Uncle Tom" had taught me over the years.

In retirement, Tom may not be writing much for his many fans in the future. But I would just like to say to folks that, if you have enjoyed what I have had to say over the years about radio, don't thank me, thank Uncle Tom Kneitel. He's the reason why I am here with my words. Peace on you, Tom. You will always be my hero.

Serious about Satellites

"I have worked in electronics since the late '50s. That consisted of 2-way radio, TV, avionics and assorted other areas. One of the areas I did not work in is satellite communications.

"That brings me to my questions. I recently switched from DISH to DIRECT satellite. The DISH antenna is still attached to the house. I want to use the setup to receive free TV that is being broadcast.

"Will this set-up do it for me? I obviously would have to reposition the antenna.

"How does one find the new transmissions? There were some articles in recent *MT* concerning this, but left me with questions.

"Are there resources on WWW to get more information?"

— Tom Humes

Thanks for your excellent question which will be of interest to all *MT* readers. Here's a quick check list of the differences between DBS satellites (such as DirecTV or DISH Network) and broadcast satellites that carry the MPEGII FTA channels you want to watch:

- 1) DBS satellite signals are circularly polarized; broadcast satellite signals are linearly polarized.
- 2) DBS satellites are all Ku band; broadcast satellites use both C and Ku-band frequencies.
- 3) DBS satellites use different Ku band frequencies than broadcast satellites.
- 4) DBS power output is about 10 times as great as those of broadcast satellites.

What this all means is that to receive broadcast satellites on a DirecTV or DISH Network dish you would first have to replace the LNBF, but then you would also have to replace the reflector because the 18-inch DirecTV dish is too small to capture enough signal from a broadcast satellite to be useful. So, your best bet if you want to watch MPEGII FTA signals is to find a nice 3-foot diameter dish and put a standard Ku-band LNBF on the feed.

Even after doing all this, you would need to buy an MPEGII FTA receiver, because the DirecTV and DISH Network receivers are designed to receive only their signals. There are several sources for this type of dish and receiver. First go to www.skyvision.com and check out their FTA and Ku-Band equipment pages. The cheapest and most useful is to buy a GlobecastTV system from [\[worldtv.com\]\(http://worldtv.com\) and find your way to the U.S. \(English\) section. These are complete systems which cost under \\$200. I like them because they're very well made, easy to install, and have the advantage of having a "smart card" which will let you subscribe to world TV channels on Galaxy 25. Read my *Beginner's Corner* columns in the June and July issues of *MT* for full details.](http://www.globecast-</p>
</div>
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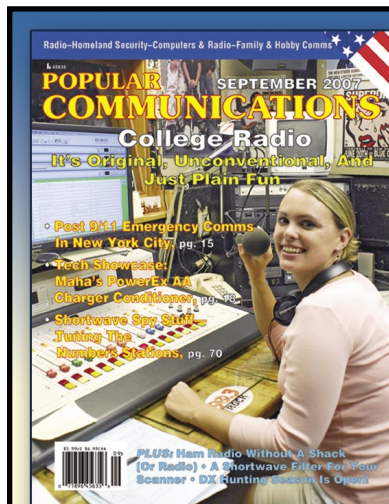
You may actually be able to use the roof mount of your old DirecTV system and the cable which will save you some time and effort, but that's all you'll be able to salvage. Hope this helps. Let me know how it goes and keep in touch.

— Ken Reitz

"I read with interest [Bob Grove's] article in *Monitoring Times* on Inmarsat. The Inmarsat B terminals use digital voice modulation. Inmarsat uses the same IMBE Vocoder for its B terminals as APCO-25 uses for its digital voice communications. The Inmarsat B voice terminals use QPSK and are APC coded. The AOR ARD25 supports QPSK modulation; I have the confirmation from AOR Japan. I have no idea how to solve the problem with the APC coding. If you have any idea please let me know."

— Eric Van den Bulcke

Are any readers able to help? APC coding appears to be a digital audio processing and compression standard.



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The Bizarre World of Pirate Radio

By Gayle Van Horn W4GVH

"The 41 meters shortwave pirate band – these are the continuing voyages of RBCN on public access subspace radio. Red alert, red alert, this is Radio Bob – I say again this is Radio Bob – Happy Halloween DXers, you're listening to RBCN and the Radio Bob show."

What followed that Halloween night in 1993 was a thirty minute voyage through the bizarre world of ghostly howls, commercials for Preparation Rush, Chock Full of Nuts coffee and "Ted Turner's" latest radio show, The Degrading Game.

Rev. Thirty stopped in with an unholy word about the Triple Six Lounge and Nude Drive Inn off of Route 9 in Shake Rag. "Down at the Trip Six you can wet your evil craving with hot wings from Hell and bare witness to lewd and lubricous behavior involving the foxiest fallen flowers in the county, where the devil's handiwork is displayed seven nights a week."

Bob's only request for the night was "a couple of jelly donuts" to cover his postage for QSLing from his Atlanta, Georgia, mail drop.

Today the world of pirate radio is just as bizarre, off color, and unpredictable. So why do some DXers prowl the bands looking for the bizarre and outrageous?

The basics of pirating

To begin with, pirate radio is illegal. In its simplest terms, pirate radio is an unregulated and illegal radio broadcast transmitting with enough power to reach potential listeners.

A pirate operator can be the ultimate shock jock without limits, or he may present a professional sound – done his way. Sure, he knows he's illegal, but the operator's goal is to push the envelope and present a show unlike any heard in legal broadcasting.

Pirates broadcast on low-powered equipment, as an alternative to commercial radio. Unlike a clandestine station using the airwaves to promote political change, most pirate programming is non-political. There have been, however, stations promoting the Gulf War and right-wing or left wing politics. Stations referred as "free radio" usually focus on

one topic or cause. A few pirates focus on drug-advocacy formats. Others may satirize another hobbyist or a particular entertainer.

Pirates can be found throughout the radio spectrum, including medium wave, long wave, FM, microwave satellite bands, television and shortwave. The operator could be a radio hobbyist, a college student in his twenties, or an unemployed radio geek. He may be the neighbor kid you thought spent all his time on an XBOX. Take a scan through the "pirate" frequencies and you'll find a diverse variety of operators.

Although it is illegal to operate, it is not illegal to listen, correspond with, or receive a verification from a pirate station. It's the operator who watches his back for the Federal Communications Commission (FCC), known as "Uncle Charlie." The dreaded "knock on the door" is well-known in operator circles.

Early pirate years

Pirate broadcasting in North America has been considered a phenomenon that began in the 1970s, but actually there were a large number of stations that operated even before the 1940s. Most of them broadcast as regional daily stations on low-powered frequencies near the AM broadcast band and existed until forced out by the passage of the Communications Act of 1934.

By 1937, few pirates remained on the air. Even fewer existed during WW II, due to a loss of operators and manpower. By 1945, the original group of operators had nearly vanished for good.

Pirate radio, post World War II, except for a few low-powered experimenters, was nearly nonexistent. Tom Kneitel, former editor of *Popular Communications* magazine, operated a few times in 1948 with 25 and 100 watts on 1165 AM from New York. Despite his low-power, he received reception reports from Pennsylvania, Ohio, New Jersey and Massachusetts. His last broadcast was New Year's Eve 1948 when his father walked in!

The Falling Star Network, a three-station network, became a popular pirate voice in 1970 from Yonkers, New York. The stations were op-



erated on AM and FM, by J.P. Ferraro and Alan Weiner, the current owner of shortwave station WBCQ. The two presented a community service alternative dedicated to the youth culture, and established a following among the media and the general public. In July 1971 the network left the air, but within weeks the FCC confiscated their equipment anyway. Weiner and Ferraro were released on probation, and later began Radio Newyork International and KPRC. Other well-known stations of the era included Radio Free Nashville, Voice of the Purple Pumpkin, and Radio Free Harlem.

Art Bell, former host of *Coast to Coast AM*, dabbled in pirate radio. While serving in the U.S. Air Force, in his spare time he operated a pirate radio station from the Amarillo Air Force Base in Texas. As part of his programming, Art was going out of his way to play antiwar songs because they weren't being played on American Forces Network. I wonder what radio hobbyist can claim hearing Art's early days on radio?

Europe's offshore voice

DXers may not realize that most of the '60s music, which the U.S. experienced as the British invasion, would not have been possible if it hadn't been for offshore pirate radio ships. Offshore stations gave exposure to countless artists, including The Beatles, The Who, Rolling Stones, Dave Clark Five and many more. The explosive '60s rock 'n rollers would have had little chance of getting their records aired if not for the pirates.

At that time the BBC had allocated a mere



seven hours a week to recorded music, and certainly not the type that British teenagers wanted. Referring to the BBC, the late Beatle George Harrison once stated, "It doesn't give the public the service it wants, otherwise the pirates wouldn't be here to fill the gap."

Britain's first offshore radio station, Radio Caroline, began broadcasting on Easter weekend 1964 from the ship *Ross Revenge*, anchored just outside the United Kingdom territorial waters. To establish the station's format, DJ Ronan O'Rahilly began his show with Buddy Holly's *Not Fade Away*. From there, *Caroline* (named after President Kennedy's daughter) broadcast from a succession of ships in the North Sea until the early 1990s. Today, Radio Caroline programming originates from a land-based studio in Maidstone, and is available through the WorldStar satellite radio system and on live internet audio at <http://radiocaroline.servemp3.com/>

Radio Caroline was followed by a host of rival pirate radio stations based on marine structures and boats scattered around the British coastline. Several of the stations used abandoned WW II sea defenses in the Thames Estuary, which were perfect platforms from which to broadcast and which offered a stable alternative to being tossed around on a ship.

As with Caroline, stations Radio Essex, Swinging Radio England, Britain Radio, Radio City, Radio London, Radio Scotland, and Radio Atlanta, helped set the trends for European pirate radio. The offshore pirates rapidly won an enormous and enthusiastic audience who flocked to the shoreline to watch the *presenters*, as the disc-jockeys were called, arrive back on the mainland after the show. The presenters established rock-star status throughout Europe, and remain the legendary heroes of offshore radio.

Active Euro pirates

Though not on the same scale as the early offshore pirates, current European stations represent a prolific number of active operators scattered throughout Europe. European pirate activity is best heard in North America from 2100-0200 on Saturday, and 0600-0800 on Sunday morning. The 'Euros' can be found on FM and shortwave in AM, upper or lower sideband on 3900-3950 and 6200-6878 kHz. The higher frequencies may find them near the lower end of

the 13 meter band and on 15055-15080 kHz between 1300-1800 UTC on weekends

Generally speaking, stations in the United Kingdom have a more professional sound, similar to a commercial rock station. Jingles, weather and music are presented with a DJ's friendly banter. Broadcasts may be for several hours or a weekend special. Ob-



viously most of today's crop of operators have been inspired by the offshore stations of the past. A few UK pirates relay American and Canadian pirate shows, much to the North American operators' ire.

Recently audible Euros have included Big L, European Music Radio, Classic Rock Radio, Radio Merlin International, Radio Rapido, and Starship Radio.

The Dutch pirates are active and increasing in number. Most Dutch stations are a one or two-man operation, building their own transmitters, some in excess of 1,000 watts. Free Radio Service Holland appears to be the favorite, and has been heard on 6289. FRS has a professional sound of news and music, a vast contrast from most "Dutchie" pirates. Additional Dutch pirates include Orion Radio, Q-103 Radio, Cupido Radio, Finn Hits Radio, Black Arrow Radio, Radio Alfa Lima International, Radio Likedeeler, Borderhunter, Radio Brigitte, Radio Casanova, Radio East Coast Holland, and Radio Boomerang.

Where the Dutch broadcast in English and Dutch, the German pirates stick to their German language. Operators present a wide variety of programming, usually a mix of hip-hop, punk, techno, pop, rock and German schlager music. Stations currently being monitored include Radio Atlantis, On-Air AM, Radio Blue House, Radio Bermudadadrieck, Radio Geronimo, Radio Dr. Tim, Radio Malaysy, Radio Stortebeker, Radio Fox, Radio Devalon, Radio Enjoy De Luxe, Radio Thunderbird and Radio Gloria International.

Pirates from Italy, Latvia, Sweden and Ireland mostly relay programming from other stations. Radio Odyssey from Greece has been heard this year on 6308-6310 kHz. Local sunset or weekends are the prime times to check in eastern North America.

South American pirates

Many low-powered community stations operate without the benefit of licensing in South America. Most are from independent operators in Brazil or along the Andes, transmitting from a dilapidated apartment with outdated equipment.

Radio Piraña International, originally a Euro pirate in the 1990s, has been the most frequently heard South American pirate station. RPI is operated by Jorge Garcia, a radio hobbyist, using 500 watts from a homemade transmitter into a directional antenna array. The station has been heard intermittently, and was last heard

on 6307 at 1100 and 2300 UTC. Look for South American pirates using 6880 USB, 6925 AM and USB, 6935 USB, 6950 LSB, 11420 AM, 11440 USB and 15465 LSB.

Former voices of the night

Pirate hobbyists once tuned in to hear Friendly Freddy's Budget Burial, "where death is cheap," or Radio Airplane, where Captain Eddy regularly piloted his Cessna from "the clear skies over North America."

Another favorite was He-Man Radio, which premiered on April Fool's Day 1991. Together with his son He-Man. Jr., the duo produced a show of sports and rock music, with a heavy amount of sexual content. Programming was broadcast in "upper side band," which the station announcers called the "manliest of modes." In 1992, He-Man unsuccessfully ran for President of the United States on a sexist platform as the "Manly Choice." That same year, the manly He-Man Radio won the A*C*E* Pirate Popularity Poll.

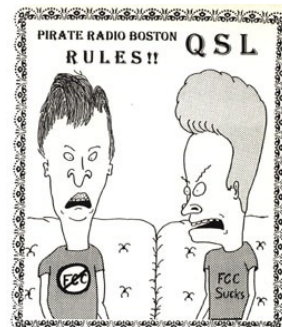
Other voices have included Anteater Radio, transmitting while mobile from an 18-wheeler truck on his route across America. PJ Sparks relayed a number of pirate stations over WREC, known as Radio Free East Coast. Radio Bob operated a joint broadcast with Radio Bob Communication Network and the Voice of Shake Rag, a home produced show of southern-comedy skits, presumed to be transmitting in or near Shake Rag, Georgia.

The primary mission of popular Secret Mountain Laboratory was as a relay transmitter for other pirates. Occasionally they produced their own folk and new age music, and claimed to be broadcasting on a mountain in Hilo, Hawaii.

Among pirate radio fans, Voice of Laryngitis is likely the best and most popular station in the field of classic pirate radio. *MT's* George Zeller has stated, "Few stations have come close to duplicating the complex and humorous original skits." The station was operated by the large extended Huxley family, with the main announcers being Genghis and his nephew, Cowboy Stan. Together with Rev. Billy Bob Huxley, Bull Bruiser, Fudgie and the gang, programming was sponsored by Friendly Freddy Budget Burial and Kitchen Cremation Kits. Other skits included Mr. Rogers Neighborhood and news coverage of the Persian Rug War. Recently VOL has been active again on 6925.6 AM from 2309 to past 2322 and around 0225 with encore programming.

Vintage voices of today

There are a few long-standing pirate stations that continue to broadcast despite the odds. The annals of pirate radio are full of voices that once graced the airwaves, only a few





of which are still active.

One of the few active longtime stations is Radio Azteca, a DX parody station presented by Bram Stoker, who is said to do some DXing on the side. George Zeller commented recently that "Radio Azteca is one of the best DX humor pirate stations in broadcasting history." Bram can be heard on 6925 or 6955 AM.

The ghost of Pancho Villa still haunts the shortwave listeners, but only from the SWL Winterfest at Kulpville, Pennsylvania. For several years now, Pancho has revived his ride at the yearly radio festival. No doubt he'll ride again next year on or around 6925 AM during the fest.

WBNY began operations in March 1990 as a popular seasonal Easter station among North American pirates. Today the high-pitched Commander Bunny encourages rodents to revolt against their human oppressors. His slogan is the "Voice of the Rodent Revolution." Fans have recently logged the Commander on 6990 USB and transmitting using digital Slow Scan TV (SSTV).

Pirate Radio Boston has been broadcasting since 1992. At that time, the station was heard via the transmitters of pirate CSIC. The main announcer was Charlie Loudenboomer, who presented a mix of light pop music. DXers might recall Charlie for his controversial and amusing editorials in the now defunct *FRENDX* monthly shortwave publication. Pirate Radio Boston remains active, but is this Charlie Loudenboomer the original? You be the judge on 6875 AM or 6925 USB.

The Crystal Ship, whose name was derived from the 1960's song title by rock group The Doors, is known as *The Official Radio Voice of the Blue States Republic*. The Poet and The Radical aired on The Crystal Ship from 1982-1984, denouncing the U.S. foreign policy in Central America, the Reagan Administration, the

music industry, and endorsed Jesse Jackson for President in 1984. The Poet revived the station, based in the Great Lakes region, in September 2004 and has been heard regularly since then on 6875. Reception reports can be emailed to the Belfast mail drop or tcsshortwave@yahoo.com. To join the mailing list of upcoming transmissions and current frequencies, send your request to tcsshortwave@gmail.com.

Taliban pirating

Pirates can broadcast from anywhere, including in the midst of a war zone. Recently *DX Window*, the e-newsletter of the Danish Shortwave Club International (DSWC), released information on a reactivated Taliban-run pirate station, broadcasting to neighboring provinces within Afghanistan.

Despite its poor signal quality, Voice of Shariat was running Koranic verses, and a message from fugitive leader Mullah Mohammed Omar.

Two years earlier, the Taliban announced Voice of Shariat as a pirate radio station from somewhere in their former stronghold of the south. At that time, the Taliban planned to use a mobile transmitter to avoid being shut down by American or Afghan forces. Voice of Shariat is reported to be on 7070-7090, including English news at 1530-1545.

Keeping up on the latest

By now you've probably asked yourself, "Without a set program schedule, how does one keep up with the latest on the pirate scene?"

The most popular and current on-line source is *Free Radio Network* at www.frn.net/. Their slogan is *the definitive free radio web site*. At the FRN site, radio listeners or station operators can exchange ideas and inform the fans "we're on the air tonight." The latest news or logs are covered in the Message Board link, called *The Vines*. Forums include *The Grapevine Pirate Shortwave*, a place DXers can vent their thoughts on the unlicensed or the FCC. Schedules and transmission announcements are found under *PX Announcements*. The largest and most active forum is *A*C*E* Loggings*, for posting station logs heard on the air. A few pirate operators regularly scan the logs for potential QSLing. The FRN site includes a link of *Pirate Radio Photos & QSLs*, a

photo link list of nearly 20 years from unlicensed stations, and several other pirate-related links.

Once a week, FRN produces an email newsletter *Free Radio Weekly*, devoted to the hobby of pirate listening. Five editors alternate duties and distribute the electronic newsletter free to those who contribute. Newsletters focus on logs of the past week, QSLing, station news or schedules, and a list of mail drops and station email addresses. To request a sample or contribute to the FRW, send your email to freeradioweekly@gmail.com.

Some of the Free Radio Network gang may also be found on the weekly electronic newsletter from the *Michigan Area Radio Enthusiast* (MARE). All aspects of radio are represented in most MARE newsletters, including what they're hearing from the pirates. MARE is published weekly in the winter, and less frequently in the off seasons. To learn more about their free enewsletter for contributors, send your email to: MARE_Inc@hotmail.com. You can also write them at: Michigan Area Radio Enthusiasts, Inc., P.O. Box 200, Manchester, MI 48158 USA.

DXer Chris Smolinski runs the Pirate Radio Central web page at www.blackcatsystems.com/radio/pirate.html. The page includes information about the pirate radio IRC (Internet Relay Chat). Additional information on pirate chat can be found at the SW Pirate Group at <http://groups.yahoo.com/group/SWpirates/>.

Don't forget *MT's* pirate aficionado, George Zeller, and his monthly column *Outer Limits*. Leave it to George to keep you up on the latest from station news to logs. Send your questions or logs to him at georgezeller@monitoringtimes.com.

Known as the "Pirate King," Chris Lobdell of Stoneham, Massachusetts, edits the monthly column *Pirate Radio Report* for North American Shortwave Association (NASWA). Columns include the latest news and logs. Write to NASWA for subscription information at 45 Wildflower Road, Levittown, PA 19057 USA or contact Bill Oliver at weoliver@comcast.net or Rich D'Angelo at Rdangelo3@aol.com.

Besides legal stations, pirate news and logs can also be found within the weekly *NASWA Electronic Flashsheet*. The newsletter is distributed

PIRATE MAIL DROPS

Basel

Box 510
CH-4010 Basel
Switzerland

Belfast

Box 1
Belfast, NY 14711
USA

BRS/Blue Ridge Summit

Box 109
Blue Ridge Summit, PA
17214
USA

Bremen

Box 334
Bremen, IN 46506
USA

Eisenach

SRS Deutschland
(station name)
Postfach 10 11 45
DE-99801 Eisenach
Germany

Herten

P.O. Box 2702
6049ZG Herten
Netherlands

Huntsville

Box 11522
Huntsville, AL 35814
USA

Merlin

Box 293
Merlin, Ontario NOP 1W0
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Neede
Netherlands

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c/o SRS News
Ostra Porten 29
S-442 54 Ytterby
Sweden





free to those that contribute. For a sample copy or if you'd like to contribute, write to Rich D'Angelo's above email address.

Hard-Core-DX www.hardcore-dx.com/ contains a wealth of shortwave information including pirate logs. All radio DXers are welcome to join the mailing list at the HCDX website.

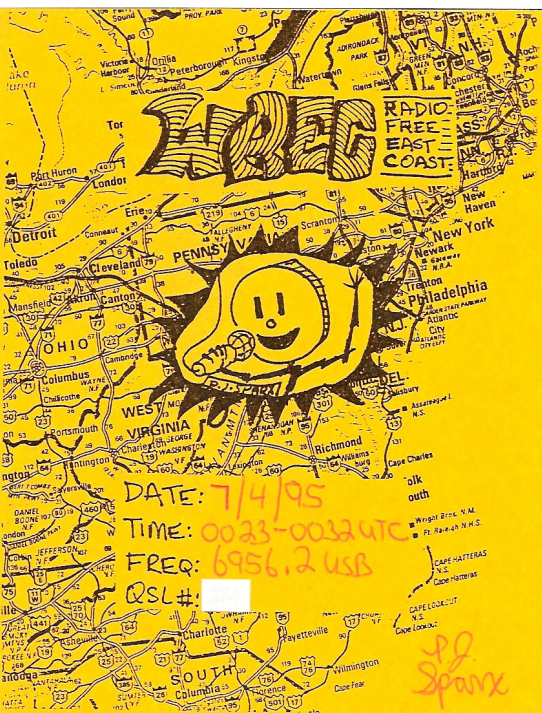
European pirate fans can find the latest observations of free radio at the *Shortwave DX* blog at <http://shortwavedx.blogspot.com/>. Located in the United Kingdom, the anonymous host lists daily logs and occasional pirate addresses.

Achim's *Free Radio Disaster* blog at www.freeradio.de or www.achimbrueckner.de/freeradio/php/wordpress/ is presented by Achim Brueckner, a DXer that has been actively pursuing shortwave and medium wave pirates since 1988. The blog is frequently updated with logs, news and real audio links. Email may be addressed to mail@freeradio.de.

Alfa Lima Int-Free Radio Board www.alfalima.net/ contains a large site of medium and shortwave message boards including *Listening & Transmitting* with six subcategories, *Marketplace*, *Technical* and more.

Harri Kujala's website from Naantali, Finland, has pirate QSLs and links to Greek, Serbian and Russian pirate logs, and a link of 45 Dutch pirates logged in 24 hours. Website <http://koti-sivu.dnainternet.net/harriku/index.htm>

Radnar Daneskjold runs the *Shortwave Pirate Info* site at www.piratesweek.info/. Links include *RF Programs*, *Pirate News*, *Propagation*, *Antennas*, *Audio Downloads* and more.



The *Pirates Week Podcast* link has a pirate blog and on-demand podcast audio. Programming is biweekly and takes a look at the past week in pirate activity, what's going on at *Free Radio Network*, and general pirate news.

Alex Draper keeps the *Shortwave Pirate's Archive* site at www.piratesweek.info/ with links to *Shortwave Pirate Audio/QSL* and *Latest DX Programs Audio* in streaming audio or to download.

Radio Intel at www.radiointel.com/ at the *DX Press* link has various pirate and DX program links.

If you're still looking for more, search for "pirate radio" at the following web sites. About.com www.about.com Wikipedia www.wikipedia.org and Google www.google.com. An additional source is Andrew Yoder's book, *Pirate Radio Stations, Tuning into Underground Broadcasts in the Air and Online*.

When, where, who, and how?

Unfortunately for fans, pirate stations do not adhere to a set broadcasting schedule. Almost all North American pirates are heard on 6925 (AM or USB), plus or minus 30 to 40 kHz. Broadcast hours can be at any time, but the majority of North American pirates operate between 2200-0400.

Weekends and major holidays are prime time for special programming. This year Halloween is on Wednesday, so check for pre Halloween shows on the weekend of October 26-28, as well Halloween night.

April Fool's Day is always a date to watch, as well as all holidays including Christmas, Hanukkah, New Years, July 4, Labor Day and Thanksgiving. Don't forget the "full moon" evenings, since quite a few pirates have been known to pop up with a bizarre show.

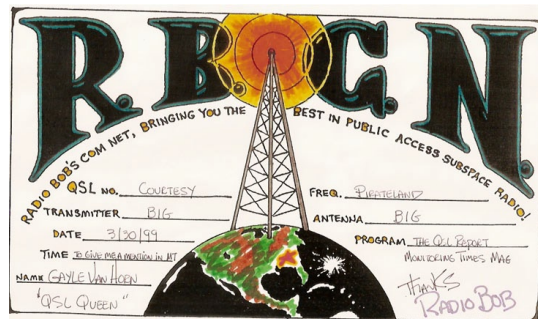
Finally, it is unlikely you will hear the low power pirate station on a portable shortwave radio. A good, high quality table top receiver and antenna are essential to capture the weak signals from North American and European stations.

With the proper set-up, you may hear Captain Morgan, Grasscutters Radio, MAC Shortwave, Radio Ice Cream, Radio Maple Leaf, Sunshine Radio, Radio 6X, Dried Kangaroo Radio, The Crystal Ship, Ground Zero Radio, Wolverine Radio, Radio is My Friend, Hey Joe Radio, Northwoods and Undercover Radio. Two new stations are Long Range Radio and Mind Botch Radio.

QSLing pirates

QSLing the pirate world is a bit more complex than verifying Radio Netherlands or your favorite stations from Asia.

Most pirates in Europe and the United States use mail drops to handle their mail. If one is used, they are normally announced in the programming. Letters to mail drops are received by a "go-between," who forwards the letter to the station operator. The operator may reply directly or resend it to the "go-between" maildrop, thus eliminating any trace of where the station is located. Running a mail drop is not illegal, and the Belfast drop has been operating since 1989.



All reception reports to pirate stations require three first class postage stamps for United States mail drops, or two U.S. dollars to foreign addresses. Currency defrays return postage cost for mail forwarding and a return souvenir QSL card or letter to your address.

A number of pirates prefer email correspondence, bulletin logs, or posting on internet web sites instead of regular mail through a mail drop. Usually the station's preference is announced during the programming. A few stations offer both options for correspondence. *Free Radio Network* accepts logs via their Message Board link at The *A*C*E*Loggings* link.

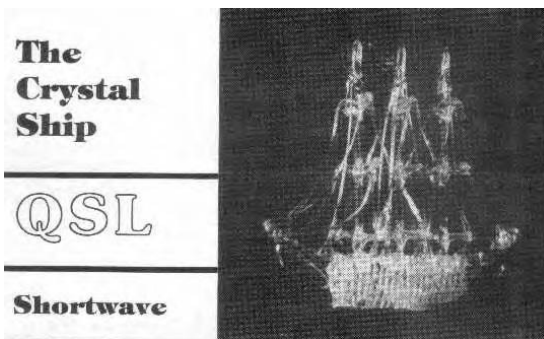
Current listings of mail drops for Europe and North America are listed in the *Pirate Mail Drop Table*. An extensive listing of European and North and South American stations, including addresses and email, can be found in the author's *World QSL Book* from Teak Publishing, P.O. Box 297, Brasstown, N.C. 28902 or via email to teakpub@brmemc.net for ordering instructions. (See What's New, page 74.)

Calling Radio Bob

So, where is Radio Bob today? And what became of He-Man Radio? Did the odds finally catch up with them? Or, could they be on the air today under the guise of a new persona? Such guessing games are part of the attraction of pirate radio for a certain segment of the listening hobby.

While we certainly don't condone the practice of pirate broadcasting, our intent in this article has been to inform our readers of an alternative facet of radio that continues to flourish around the globe. Pirate radio is illegal, but it is the operator that eventually may suffer the consequences. Our motto: If it's on the air, we will listen!

(Though not a complete listing of all North American and European pirate stations, this article has focused on selected stations that are being monitored in 2007. Frequencies (kHz) broadcast hours (UTC) and web sites represent those current at time of writing.)





VBR Prescott Coast Guard Radio

By Ron Walsh

The VBR staff - John Diaz, Diane Faubert, Rob Pringle, and (seated) Ron Bygott, station manager.

*Fairlift, Fairlift, here is the Canadian Empress on 13.
Canadian Empress go channel 10.*

Fairlift, the Canadian Empress, we are going up bound in the seaway channel and will turn at Sisters Bay. We will then proceed down bound and leave the Seaway at Deer Island.

Roger, Canadian Empress, thank you for the information.

I have been fortunate to have a few days aboard, as mate, on the 64 passenger cruise ship *Canadian Empress* this summer. The above radio conversation took place as we were cruising the American Narrows above Alexandria Bay, New York. This is a narrow channel and communication between ships is vital. After I had contacted the *Fairlift*, a heavy lift vessel, I looked at the Digital Selective Calling (DSC) radio and thought just how far marine radio on the Great Lakes has come in the past hundred years. Then, I looked at the AIS (Automatic Information System) radio display and could see at a glance what ships were in range, along with their course and speed. This information allowed a mental calculation that showed we had 30 minutes to clear the channel before the *Fairlift* overtook us. Our positions were verified by GPS, which

was fed into the AIS.

A Visit with the Past

Great Lakes Marine Radio began right after the *Titanic* disaster. Money for Great Lakes radio stations was appropriated in 1913 and stations such as VBH Kingston were operating by 1914. They were, of course, Morse code transmissions, and people referred to it as the Marconi Station well into the 1960s.

After World War II, voice was added and the Morse slowly left the Lakes. These marine radios gave way to the first AM marine radiotelephones. They were huge tube

machine and had a telephone handset to speak into. They were usually in the 2 MHz band, but some 4 MHz band frequencies did come in. They were usually Marconi equipment and had a dynamotor to provide the power. Since the ships were running DC power, regular transformer power supplies did not work. The dynamotor was basically a 100-volt DC powered generator that provided the higher voltages for the transmitter. Every time you pressed the transmitter switch on the handset the transmission was accompanied by a high whine from the dynamotor.

Several shipping lines, such as Hall Corporation and Upper Lakes Shipping, established their own shortwave stations soon thereafter. In the '60s, hybrid radios using transistor receivers and transmitter circuits, along with tube drivers and finals, began to appear. These sets were much smaller and ran on 12 volts.

In the late 1950s, the FM marine radio-telephones arrived. Again, they were large machines but they rapidly got smaller. I recently purchased a Pearce Simpson hybrid FM marine radio, which I have donated to



The author, wishfully thinking...



CCGSSimcoe, a retired light icebreaker, awaits sale at the Prescott Coast Guard Base. Note antennas in the background.

VHF Radio Channels at MCTS Remotely Controlled Sites

MCTS Centre	Remotely controlled sites at:	Ship/Shore radio channels available:	CMB channel
Thunder Bay	Thunder Bay	12, 16, 65A, 70, 85	83B
	Horn	16, 22A, 24, 65A, 70	21B
	Bald Head	16, 22A, 27, 65A, 70	83B
	Sault Ste Marie	11, 16, 24, 65A, 70	21B
	Silver Water	11, 16, 27, 65A, 70	83B
	Killarney	16, 24, 65A, 70	21B
	Tobermory	16, 22A, 24, 65A, 70	21B
	Pointe au Baril	16, 26, 65A, 70	21B
	Warton	16, 26, 70	
	Meaford	16, 65A, 70, 85	83B
Sarnia	Kincardine	11, 16, 22A, 27, 65A, 70	83B
	Sarnia	11, 16, 22A, 24, 65A, 70, 85	21B
	Grande Pointe	11, 12, 16, 65A, 70, 85	
	Leamington	12, 16, 22A, 27, 65A, 70, 85	83B
	Rondeau	12, 16, 65A, 70, 85	21B
	Port Burwell	12, 16, 22A, 24, 65A, 70, 85	83B
Prescott	Fonthill	16, 22A, 26, 27, 65A, 70	83B
	Trafalgar	16, 24, 65A, 70	
	Orillia	16, 26, 65A, 70	21B
	Cobourg	16, 22A, 27, 65A, 70, 85	21B
	Kingston	16, 22A, 24, 26, 65A, 70	23B, 83B
	Gananaque•	16, 65A, 85	
	Cardinal•	16, 26, 27, 65A, 70	21B, 83B
	Cornwall•	16, 65A, 70, 85	23B, 83B

CHANNELS AND FREQUENCIES

Marine Communications and Traffic Services (MCTS)

Chn	Frequency MHz
6	156.300 Intership channel
11	156.550 Vessel Traffic Regulating
12	156.600 Vessel Traffic Regulating
16	156.800 Distress, Safety and Calling
21B	161.650 Continuous Marine Broadcast (CMB)
22A	157.100 Coast Guard
23B	161.750 CMB channel (French)
24	161.800 Radiotelephone
26	157.3/161.9 Radiotelephone
27	161.950 Radiotelephone
28B	162.000 French
65A	156.275 Search & Rescue
70	156.525 Digital Selective Calling (DSC)
82A	157.175 Coast Guard
83B	161.775 Continuous Marine Broadcast (CMB)
85	161.875 Radiotelephone

our local marine museum. These sets were all crystal controlled.

With the advent of the Phase Lock Loop, tunable VHF FM marine radios became available and the price dropped as well. Ship traffic control in the Seaway moved to VHF and more stations were established. In the early '70s AM was replaced by Single Side Band (SSB)

on the HF stations. Shortwave became redundant and disappeared from the Canadian Lake stations in the mid 1970s. The private stations lasted somewhat longer, but the last one, XJP52, stopped operating in the 1990s.

Transport Canada began to consolidate the local marine radio stations by running some stations as remotes. They were connected by phone line to a central station. Our own VBH Kingston became a remote for VDQ Cardinal in this manner. Greater VHF service and continuous marine broadcasts began during this time. VDQ also remotely ran a 410/415 MHz UHF link to the Main Duck Islands lighthouse as well. Sadly, the lighthouse is now automated and that channel is gone as well.

Gradually, all the Great Lake stations, as well as Churchill, Manitoba, on Hudson Bay were consolidated into three central stations. The control centers are located at VBA Thunder Bay, VBE Sarnia, and, of course, VBR Prescott Coast Guard Radio stations. I was actually monitoring when the announcement was made that VDQ Cardinal had gone off the air and VBR Prescott had begun service. I recently heard the first DSC Mayday alert from VBR and realized again how much has changed.

Visiting Today's Busy VBR

I asked for permission to visit the station and received a polite reply from Ron Bygott, the station manager, that they would be happy to have a visit and an article written about the station. Like all radio operators, I also wanted to put a face on the people I had talked to many times. I am always amazed when the face seems so different from what you imagine.

VBR is located at the Prescott Ontario Coast Guard base. Prescott is about 65 miles east of Kingston where I reside. The base is located on the St. Lawrence River and also is used as a service base for the Coast Guard Aids to Navigation and icebreaking vessels. *CCGS Griffon* and *CCGS Caribou Isle* can often be seen here.

I guess I am dating myself when I say I have visited all the local marine stations over the years. I was in high school when I visited VBH and saw the tube transmitter and receivers in the building on Fort Henry Hill near Kingston. I was also in the station at Cardinal in the '70s and had a good look at the transmitters and station consoles. The antenna towers were still located at the sites. The old VBH site is completely gone, but the VDQ building is still there.

My longtime radio friend, George Kennedy, VE3GHK, and I were met by Ron Bygott and shown up to the operations center. Before going in, Ron gave us an overview of the station.

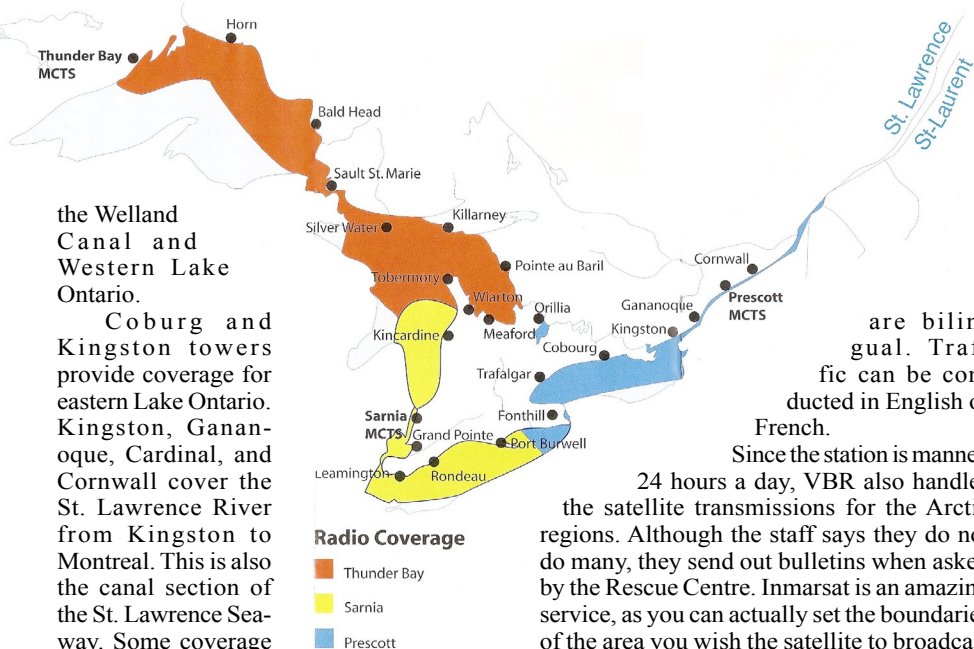
VBR controls eight remote sites and handles VHF marine communication from near Montreal to the middle of Lake Erie. Their coverage overlaps with Montreal Radio in the east and with Sarnia Radio on Lake Erie. The transmitter sites at Fonthill, Trafalgar and Coburg maintain coverage of eastern Lake Erie,

John Diaz



Diane Faubert





the Welland Canal and Western Lake Ontario.

Coburg and Kingston towers provide coverage for eastern Lake Ontario. Kingston, Gananoque, Cardinal, and Cornwall cover the St. Lawrence River from Kingston to Montreal. This is also the canal section of the St. Lawrence Seaway. Some coverage is also provided to sections of the Rideau Canal.

The Gananoque tower, 20 miles east of Kingston, was established to eliminate a dead spot in their coverage. (HF stations VBG Toronto, VBH Kingston and VDQ Cardinal used to cover this area.)

The Orillia tower covers Lake Simcoe and some of the Trent Severn Canal system, as well as southern Georgian Bay. Since the Seaway stops operating from late December until early March, the Gananoque, Cardinal and Cornwall towers operate from March 15 until December 31. The other towers operate year round, 24 hours a day.

Since VBR covers the Seaway, services

are bilingual. Traffic can be conducted in English or French.

Since the station is manned 24 hours a day, VBR also handles the satellite transmissions for the Arctic regions. Although the staff says they do not do many, they send out bulletins when asked by the Rescue Centre. Inmarsat is an amazing service, as you can actually set the boundaries of the area you wish the satellite to broadcast to.

Each tower has a variety of channels that can be used. For example, our local tower is listed as having channel 16 for distress and calling, channel 22A for work with the USCG, channel 70 for DSC, and ship to shore channels 24 and 26. They also have channels 65A and 82A for working the Canadian Coast Guard. I have also heard them on channel 6. (See the list of channels for the towers in the sidebar, courtesy of a Canadian Coast guard brochure.)

The continuous broadcast is on channel 83B. They also have back up transmitters for channel 16 and the Continuous Marine Broadcasts at the towers. You can often hear the operators testing the transmitters at each tower and on each channel. This is a good way to see what VHF range you have and to test propagation conditions on VHF in case of a temperature inversion.

The English continuous marine broadcasts alternate between channel 21B and 83B to avoid interference between towers. On the new marine radios, there is a separate weather channel selection. Usually there are ten weather channels that include the eight NOAA or Environment Canada weather channels. 8 and 9 are the Canadian marine weather channels for the continuous broadcasts. You can also get the broadcast in French on channel 23B. In other areas, channel 28B is used for broadcasts in French.

Just before visiting VBR this spring, I heard the local tower would be down for two days. According to the staff at VBR, a whole trailerload of new equipment was installed, including the Digital Selective Calling (DSC) equipment. The target date for DSC on a test basis was June 22, 2007. It is expected to be operational in Sept of this year. All the towers are eventually to be upgraded. According to Rob Pringle, the operating consoles at VBR will be upgraded to touch screen models and the connecting lines to the remotes will be upgraded as well.

The DSC will be a significant change for the VHF radio. Equipped vessels will monitor channel 70 and they will only hear calls

with their MMSI (Marine Mobile Service Identity). Distress, Urgency and Safety calls will also activate the DSC radio. However, all other calls will not activate the receiver. The MMSI for VBR is 00 316 0029. As an aside, 316 acts in Canadian MMSI much like a telephone area code. The 00 indicates a Canadian Coast Guard station or vessel. If it begins with a single 0, it is a vessel from a fleet of ships.

The marine telephone call service has practically disappeared. The use of cell phones has virtually taken over. However, calls can still be patched through, and in emergencies people can be directly connected to the rescue center or other services.

Another service provided by VBR is the #16 cell phone access. If you do not have a marine radio, you can contact the station in this manner. Unfortunately, nearby vessels won't hear you, but any problem can soon be relayed by the radio station. While teaching a course on Marine Emergency Duties with Ray Throop, captain of the *CCGC Cape Hearne*, we tried this service from the Ottawa River and had no trouble contacting VBR.

Unfortunately, many false calls are also received this way, causing problems at the station. People often misdial #611 and since we live in the 613 area code, misdials of #1613 can also lead to trouble. The staff informed me that #SOS (#767) is the way to use this service in the United States. Sometimes calls bounce through from other stations when their lines are busy. Rob remembered one that came from someone floating in an ice hut under the Pierre Laporte Bridge at Quebec City.

As you can see, this is a busy station. Often the three console positions are all working traffic at the same time. There are three operators on day duty and two operators on at night during the summer high traffic period. Only one operator is on duty during the winter slow periods.

They handle between 800 and 900 may-day calls a year. These have ranged from breakdowns to vessels on fire this year. I have heard calls for a sail-training vessel on fire with 33 sea cadets aboard, a helicopter evacuation from a lake freighter for a man who fell in the hold, and a yacht which blew up because the blower fans had not been run after refueling. In my area of the river, every day I have been out on the tour boat *Island Belle*, I have heard at least one mayday call. That is just on the Kingston and Gananoque tower coverage areas.

Unlike VBE Sarnia, VBR is not a traffic control station, as the Seaway radio stations handle this task.

VBR also has a sail plan service. Vessels can file a sail plan with VBR in case the vessel runs into a problem. Once your vessel information is on file, it is very simple to file a sail plan and know someone is looking out for you. If you do not check in when scheduled, you can be sure the staff at VBR will be calling you or contacting the Rescue Co-ordination Centre in Trenton.

VBR also has a VHF RDF (Radio Direction Finding) capability. Towers at Coburg,



Remote telephone switching unit



Close-up of one of the VHF consoles



The satellite console, ready if needed.

Trafalgar and at Brougham can be used to get a bearing and triangulate the position of a transmitter. When talking to Diane Faubert and John Diaz, they told me they often are asked by the United States Coast Guard to help locate a vessel. It is not uncommon for USCG group Buffalo to ask for assistance. This service gets a lot of use over the year as it can certainly narrow down a search area.

Since we live in a border area, I must mention the high level of co-operation between the United States and Canadian Coast Guards. As an auxiliary member, I have the greatest respect for these services. During the sail training vessel fire, vessels from both services responded to the mayday. The staff at VBR handled that potentially tragic incident in a skilled and professional manner.

VBR operates a Navtex service as well. They use 518 kHz and broadcast at 0110 UTC and every four hours thereafter. The technicians at the base also maintain the Digital Global Positioning System (DGPS) station at Cardinal. This adds greater accuracy to the GPS in the area.

VBR does have a standard marine radio installed for local traffic around the station

and they will have an AIS system in the near future. New electronic charts and newer computers will be added soon.

Although there is no HF at VBR, the staff operators are often loaned out to VFF Iqualuit, on Baffin Island, during the summer Arctic shipping season. There, HF is still in use as has been mentioned in a previous column. John reported they got great range at night. Duty there is for a six week period. John said he expected to do some duty there this fall, while another operator was going up in July.

All communication at VBR is now digitally recorded and kept for at least 30 days. Any major incident recordings can be kept for up to 7 years.

The People Behind the Communications

The operators at VBR have always had a reputation for excellent radio procedures and calmness during distress situations. I have heard many a person calmed down by the professional manner in which distress incidents are handled.

I asked what problems they encountered with communications, and they all responded – the use of improper procedure, CB lingo, etc. from pleasure boaters. Remember to use the standard phonetic alphabet. Canadian mariners require, as a minimum, a Restricted Operator's Certificate to operate the marine mobile radio. Courses to obtain this can be accessed through the Canadian Power and Sail Squadron. Proper radio procedure, channel applications, and DSC are all part of the course.

Each operator also wanted me to remind people to be quiet and listen during a mayday so as not to interfere with distress communications. You may be the only person to hear a call or you might block necessary radio transmissions. VBR, with its high antenna towers, will likely hear much more than you will on your yacht.

Ron has just become the manager of the station and has many years service

at Coast Guard Stations. The previous manager, Dan Nicole, has gone to VCS Halifax. John and Diane each have had a few years' service.

Two voices I have heard many times over the years were Rob Pringle and Dave Dillon. Rob has served 36 years as a radio operator. He started at VDQ in 1971, went to VBG Toronto in 1972, did some work at VXU London, and then went to Inuvik in 2000. He remembers when the HF was discontinued in 1978. Like all DX radio enthusiasts, he talked about the long range and remembers hearing 6YI Jamaica at a Lakes station.

If you visit the eastern Great Lakes or St. Lawrence River above Montreal, you will surely hear one of the voices of VBR over one of their eight remote radio sites. They are very friendly people who can enjoy a laugh but who get right to business when a call comes in. The professional pride of the radio operator continues to be heard from behind the consoles of VBR Prescott Coast Guard Radio.

I certainly enjoyed my visit and hope to return again soon to hear more stories of interesting moments on the radio. I commented that the only thing missing there was a Morse code key. Rob said he had not seen one in years: I have located a key of about 1950s vintage and plan to take it to the station on my next visit.

In the meantime, I will enjoy any communication I have with the VBR staff over VHF radio and will regularly listen in to their broadcasts. A couple of nights ago, while captain on the *Island Belle*, I spotted a lifejacket in the river. There was no one around it, and it probably had floated away from a dock. However, the operator at VBR checked with the Trenton Rescue Centre to be sure there were no reports or incidents it might have been connected with. Though this was a false alarm, many mariners in this area can thank the staff at VBR for ably assisting them in time of trouble.

As a personal aside, as I was writing, I noted that my articles often seem to involve the letters "BR." (ZBR in Bermuda and VBR in Prescott.) Perhaps that is because my father signed the letters "BR" as a landline telegraph operator and had VE3BRK as his amateur call sign. He took great pride in his Morse operating, his "fist," and this is one more reason why I appreciate and admire the professional radio operator.



Rob Pringle - a familiar voice

Happy Birthday, Sputnik!

Tom Kneitel, W4XAA

In a sky filled today with countless orbiting military, spy, navigational, communications, weather, ham, and scientific satellites, it's worth recalling that all of this began exactly fifty years ago this month. October 4, 1957, was definitely a date to be noted. It is the fiftieth anniversary of the launching of Sputnik, and the dawn of the Space Age.

The 1950s was an era of international turmoil and intrigue. The U.S. and its allies were fighting Communists in Korea. We were engaged in The Cold War, a period of conflict and tension between the U.S. and the bloc of Soviet nations. This included both camps racing to be the first into space.

Here at home, we were holding Senate hearings to root out Communists and sympathizers alleged to be working in our government and the media. To hear them tell it, Soviet espionage agents were pretty much crawling out of the woodwork. Countless motion pictures carried this theme, sometimes using thinly disguised anti-communist metaphors hidden in science fiction storylines. It was a time of general paranoia.

It's a bird, it's a plane, it's Sputnik!

October 4, 1957, news headlines around the world screamed, "Russians launch artificial moon!" This seemed a jarring development somewhat equal to being informed the sky was falling. Was it carrying Soviet troops? Or even worse, was it spying on us? Was it transmitting mind control signals? Would it fall onto us? One thing was for certain, the thing was orbiting our planet. The Russians reported the satellite was named Sputnik 1, which loosely translated as "traveling companion 1." Radio Moscow gave it extensive coverage.

News reports claimed the object was transmitting some sort of mysterious radio signals. To a public hyped up by Hollywood horror epics the likes of *Invasion of the Body Snatchers*, *Red Planet Mars*, and *Invasion of the Body Snatchers*, there was fear and suspicion.

The public's need for calming words was not at all assuaged by Sen. Lyndon Johnson, who was quoted as stating, "Soon, they will be dropping bombs on us from space like kids dropping rocks onto cars from freeway overpasses!"

A flight of F-100 fighters was scrambled from the Air Force's Strategic Air Command headquarters in Omaha. Residents of tiny John-

ston Island in the Pacific were all issued sidearms.

Quick, Henry, the Headphones!

According to CIA monitors, the object was transmitting on 20.005 and 40.002 MHz. It made a complete orbit every 96 minutes. Sputnik's signals were able to be monitored on a line-of-sight basis as it came up over the radio horizon and passed overhead moving at 18,000 MPH at an average altitude of about 150 miles.

It didn't take me long to fire up my Hammarlund SP-600 receiver. Soon enough, signals appeared. A constant *beep...beep...beep...* slowly faded in, became louder, then faded out. It was certainly a memorable moment to hear signals from the first artificial object placed into Earth orbit.

At the time, I was living in a large apartment complex in New York. As soon as my neighbors learned I had captured signals from this object, they began popping in for an earful. I proudly offered a listen to all who appeared, including those who returned repeatedly. People were entranced. I was happy to supply refreshments to this hungry horde. A film crew from a local TV station also showed up to film the historic event.

All of this gave me fifteen minutes of fame as the hero in the apartment complex. That reputation did not extend to those few tenants who seemed convinced I was a crackpot and/or a Russian spy. They tended to shield their children from me in the elevator.

A small ball

Sputnik turned out to be a 23 inch pressurized shiny aluminum sphere from which emerged four whip antennas that ranged between seven and nine feet in length. It weighed 184 lbs. The batteries fizzled out on October 26, 1957, and Sputnik fell silent. Sputnik decayed from orbit on January 4, 1958, largely burning up as it reentered Earth's atmosphere. Someone in California claimed to have found a few charred bits from the craft.

Using your computer, you can hear an actual recording of Sputnik's signals at: www.amsat.org/amsat/features/sounds/firstsat.html.

There was no doubt about the fact that the Soviets had won first place in the hotly contested



This is the nifty QSL sent out to monitors who reported Sputnik's signals.

Space Race. For the Soviets, Sputnik was a public relations triumph. They issued a special postage stamp to commemorate Sputnik. Even better, they also issued a full color Sputnik QSL card to those radio buffs that sent in reception reports.

Sputnik was more than a publicity gimmick, it was ostensibly used to study the layers of the ionosphere and how they affected signal distribution. Nevertheless, to the U.S., that infernal *beeping* was a loud Bronx cheer, reminding us that we had lost the Space Race. Say what you will, but Sputnik was humiliating to the U.S.

The U.S. had tried hard to beat the Russians into space, failing with two Project Vanguard attempts. The first successful American launch of an orbiting object was Explorer 1 on January 1, 1958.

Close, but no cigar!

Even before the U.S. could get its own satellite up, on November 3, 1957, the Soviets sent up yet another orbiting satellite (Sputnik II), this one carrying a live dog. Sputnik V (launched in 1960) had a crew of two dogs and a couple of dozen mice. It returned to earth with all hands aboard safe. In all, there were forty-one Sputnik satellites launched into the 1970s.

Sputnik was not a total loss of prestige to the US, since it spurred the creation of NASA, and led to major spending increases in the U.S. space budget, plus advances in research and education. Moreover, it directly led the U.S. to the first manned landings on the Moon.

Monitoring Sputnik was a defining moment in my own interest in communications. My Sputnik QSL card is a highly prized DX trophy. Happy birthday, Sputnik!

Propagation Outlook October to March Winter SW Broadcast Season

By Tomas Hood NW7US

In last autumn's propagation outlook, we reviewed the current prognostications for the up-coming Solar Cycle 24. In a year's time, there has been a divergence from the wildly optimistic forecasts. What is the current consensus among space weather scientists?

The National Oceanic and Atmospheric Administration (NOAA) announced a prediction made by their Space Environment Center (SEC) in coordination with an international panel of solar experts. This press release, dated April 25, 2007, postulates that the next solar cycle will start "late." The official prediction (at the time

of writing this outlook) as presented by NOAA's SEC, puts the start of the next 11-year sunspot cycle right at the end of this outlook -- March 2008. They forecast that cycle 24 will peak late in 2011 or by mid-2012. That prediction is up to a year later than expected.

Will solar sunspot cycle 24 be a history-maker? Will it be more energetic than cycle 23? The beginning of cycle 24 was expected to start last fall. Yet, cycle 23 did not end when expected, so the international panel of solar experts disagreed on whether a weak or strong period of solar storms lies ahead. The official forecast now calls for a mediocre cycle 24, certainly not a record-breaker.

The historical record of our observations of the sun and the ionosphere tells us of daily, seasonal, yearly, and even longer-term cycles in solar activity and the resulting ionospheric properties. One of the most well-known ways to track these cycles is the *Smoothed Sunspot Number* (SSN). The propagation models in use today use the SSN as a key factor in simulating real-world propagation.

Solar Cycle	Began	Ended
1	March 1755	June 1766
2	June 1766	June 1775
3	June 1775	September 1784
4	September 1784	May 1798
5	May 1798	December 1810
6	December 1810	May 1823
7	May 1823	November 1833
8	November 1833	July 1843
9	July 1843	December 1855
10	December 1855	March 1867
11	March 1867	December 1878
12	December 1878	March 1890
13	March 1890	February 1902
14	February 1902	August 1913
15	August 1913	August 1923
16	August 1923	September 1933
17	September 1933	February 1944
18	February 1944	April 1954
19	April 1954	October 1964
20	October 1964	June 1976
21	June 1976	September 1986
22	September 1986	May 1996
23	May 1996	Circa 2007
24	Circa 2007	Circa 2018

Solar Cycles typically last an average eleven years, measured from the month of lowest sunspot activity, through the peak months, to the next month with lowest activity. These cycles, 23 so far, have been officially recorded since the 1700s. Solar Cycle 24 is just now beginning.

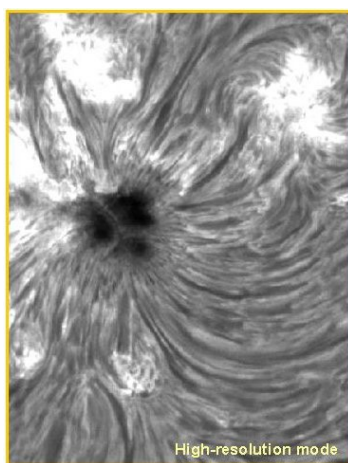
in these magnetic field lines of the sun. Sunspots appear as dark spots on the surface of the Sun. Temperatures in the dark centers of sunspots (the "umbra") drop to about 3700 K, compared to 5700 K for the surrounding photosphere. This difference in temperatures makes the spots appear darker than elsewhere. Sunspots typically last for several days, although very large ones may live for several weeks. They are seen to rotate around the sun, since they are on the surface, and the sun rotates fully every 27.5 days.



Daily sunspot observations were started at the Zurich Observatory in 1749. By 1849, continuous sunspot observations were recorded. Over time, cycles in solar activity were revealed. The Sun's sunspot activity has a cycle that lasts for an approximate eleven year period. The cycle starts with very quiet solar activity with very few sunspots, then peaking about three to five years later with a very high number of daily sunspots, and then decreasing in sunspot activity until the end of the solar cycle.

In the cycle forecast issued by NOAA's SEC, half of the solar expert panelists predicts a moderately strong cycle with a peak smoothed sunspot high of 140 sunspots, plus or minus 20, expected to peak in October of 2011. The other half predicts a moderately weak cycle of a smoothed count of 90 sunspots, plus or minus 10, peaking in August of 2012. An average solar cycle ranges from 75 to 155 sunspots. The late decline of Cycle 23 has helped shift the panel away from its earlier leaning toward a strong Cycle 24. Now the group is evenly split between strong and weak.

Regardless of the forecast, the fact remains that we are in the very bottom of the cycle (either



Plasma flows in these magnetic field lines of the Sun, known as sunspots. (Courtesy National Solar Observatory)

Sunspots are magnetic regions on the Sun with magnetic field strengths thousands of times stronger than the Earth's magnetic field. Plasma flows



ending 23 or beginning 24). Because of this, the higher shortwave frequencies are not favorable for world-wide radio signal propagation. Within the limits of solar energy levels and the resulting ionospheric activity, we can expect a fair improvement on the higher shortwave frequencies (22 meters up through 11 meters) as we move away from summer conditions into the winter ionospheric dynamics.

Winter Season MW and HF Propagation

During the winter months, the maximum usable frequencies (MUF) are generally higher during the daylight hours than during the summer daylight hours (for example, see the notes at <http://vesuvius.jsc.nasa.gov/er/seh/sun.html>). This provides short but strong openings on higher shortwave bands during the winter day. Then, at night, the MUF dips down much lower than what would be seen during the summer nights. Summertime MUFs are generally higher during the night hours than during the winter nights, due in part because the ionosphere stays energized through the short nights. Winter nights are longer, so recombination of the ionosphere (which results in a lowering of the MUF) is more complete.

This also means that the D layer of the ionosphere is less ionized during the winter, allowing medium wave and shortwave frequencies to propagate through the D layer and off of the E and F layers. Finally, the seasonal decrease in weather-related noise makes it easier to hear the weaker DX signals on lower frequencies. With thunderstorms few and far between, storm-related static and noise is greatly reduced.

Seasonally, the geomagnetic activity tends to quiet down during the winter months. The most active geomagnetic seasons are centered on the two equinoxes, in the spring and autumn. Combined with the seasonal decrease in geomagnetic activity, the lull in the eleven-year solar cycle geomagnetic activity translates to generally quiet conditions on lower HF and on the MF spectrum.

December is well enough past the autumnal equinox and the associated peak auroral activity to support transpolar propagation. With this overall reduction of geomagnetic activity and the decrease of radio signal absorption comes more stable high-latitude propagation. Medium wave DXers enjoy catching broadcast station

transmissions from over the North Pole. Shortwave DXing over high-latitude paths becomes exciting, even if the higher frequency bands might be dead.

During October, signals **below 75 meters** are still hard to hear under the seasonal static. The static then steadily decreases as we move into the longer hours of darkness during the winter months. With the seasonal reduction in thunderstorms and atmospheric static noise in the Northern Hemisphere, it becomes easier to hear the weaker signal DX.

As we get closer to January, expect DX openings during the hours of darkness and into the sunrise period. Look for openings from Europe and the south if you are listening in the eastern half of the United States. If you are listening from the western half of the country, expect openings from the south, the Far East, Australasia and the South Pacific.

Expect long-range DX on the low bands, starting close in right after sunset, and extending farther as the night develops. Signals here should peak from Europe and from a generally easterly direction around midnight. DX paths will move farther west through the night. By morning, openings from Asia should be common. For openings in a generally western direction, expect a peak just after sunrise. The band should remain open from the south throughout most of the night. Propagation in this band is quite similar to that expected on 41 meters, except that signals will be somewhat weaker on the average, noise levels will be a bit higher, and the period for band openings in a particular direction will be a bit shorter.

Forty-one meters should be the hottest DX band during the dark hours, as the seasonal static levels are lower than they were during the summer. The band should be open first for European DX in the eastern United States during the late afternoon. Signals should increase in intensity as darkness approaches. During the hours of darkness, expect good DX openings from most areas of the world. Signals should peak from an easterly direction about midnight, and from a westerly direction just after sunrise. Excellent openings toward the south should be possible throughout most of the nighttime period.

The all-season bands, **31 and 25 meters**, are crowded and signals are usually very strong and steady. These bands will often remain open into many areas late into the night and will open early in the morning, especially when part of the propagation path moves through sunlit regions. Twenty five meters is expected to be an excellent band for medium distance (500 to 1500 miles) reception during the daylight hours. Longer distance reception (up to 2000 to 3000 miles) should be possible for an hour or two after local sunrise, and again during the late afternoon and early evening. Heavy congestion will occur here since many international and domestic broadcasters make use of 25 meters.

Thirty-one meters, the backbone of world-wide shortwave broadcasting, will provide

medium-distance daytime reception ranging between 400 and 1200 miles. During November, reception up to 2500 miles is possible during the hours of darkness and until two to three hours after local sunrise. Thirty-one meters, too, is highly congested, making reception of weak exotic signals a bit more of a challenge.

Twenty-two through 19 meters compete with 16 for the best daytime DX band from October through December. They will open for DX just before sunrise and should remain open from all directions throughout the day, with a peak in the afternoon. Nighttime conditions will favor openings from the south and tropical areas. Since the Southern Hemisphere has long daylight hours, DX paths on these bands from stations in the south will be common.

Sixteen through 13 meters will be open occasionally during the first months from October through December when the 10.7-cm flux levels reach above 100 and stay there for a few days. This is not going to happen often, now that we are so close to the current solar cycle ending (predicted to be during 2007). Paths from Europe and the South Pacific as well as from Asia (at least during days of higher solar flux levels) are possible, especially on 16 meters. Look for best conditions from Europe and the northeast before noon and from the rest of the world during the afternoon hours. Reception from the South Pacific, Australia, New Zealand, and the Far East should be possible well into the early evening. When flux levels remain lower, these openings may be short-lived.

The best propagation aid is a set of sunrise and sunset curves, since DX signals tend to peak when it is local sunrise at the easterly end of the path in question. A good Internet web site featuring a grayline map display is found at www.fourmilab.to/earthview/. Follow the link, "map of the Earth" showing the day and night regions.

For short-skip openings during December, try 90 through 41 meters during the day for paths less than 250 miles, and 90 down to 120 meters at night for these distances. For openings between 250 and 750 miles, try 41 meters during the day, and both 90 and 120 at night. For distances between 750 and 1300 miles, 22 through 31 should provide daytime openings, while 41 down to 90 will be open for these distances from sunset to midnight. After midnight, 90 meters will remain open out to 1300 miles until sunrise. Try 31 and 41 meters again for about an hour or so after sunrise. For openings between 1300 and 2300 miles, openings will occur on 22 through 16 meters, with fewer on higher bands, during the daylight hours. During sundown to midnight, check 22 through 41 meters for these long-distance openings, and then check 41 down to 90 meters after midnight until sunrise. Try 41 and 31 meters again for an hour or so after sunrise.

Winter into Spring

Propagation changes again after January, as the hours of daylight increase. March is one of the optimal DX months. As the Spring Equinox approaches, the gray-line begins to run straight North and South. The return of sunlight to the polar north creates north-south openings on 11 through 25 meters. However, since we are near the end of the solar cycle and the ionosphere is

not as energized as during the peak years, east-west path openings on higher frequencies will be less frequent and shorter than the last few years.

By March, **16 meters** will still stay open long into the evenings. You will occasionally find 16 meters open all night long. Daytime paths will not degrade much until midsummer. You will see more early closures if you live closer to the North Pole.

Twenty-two and 19 meters will remain in excellent shape. Both short and long path circuits are reliable and solid. All nighttime paths are wide open during March. Prime time evening hours in the United States are sunrise hours across Russia, Africa, and in both the Near and Far East. Expect a lot of short and long path DX from these areas of the world.

Between sunset and midnight, expect occasional DX openings on all bands between **15 and 41 meters**. Conditions should favor openings from the east and south. These bands should peak for openings from Europe and Africa near midnight.

From midnight to sunrise, expect optimum DX conditions on **31 through 90 meters**, and occasionally, 120 meters. Conditions should favor openings from the west and south. Some rather good openings on 19 and 22 meters should also be possible from the south and west during this time.

Noise levels are slowly increasing as we move toward the spring season. Geomagnetic storms will increase, disrupting the mid- and high-latitude ionosphere. During the Spring Equinox, Earth's magnetic field is sufficiently perturbed by solar wind particles flowing into the auroral zone (between 50 and 70 degrees north geographic latitude) to cause the ionosphere to be depleted.

Propagation on VHF and Above

It is still possible to catch some **trans-equatorial propagation** (TE) during October. TE favors regions located about 1800 miles on both sides of the magnetic equator. (Keep in mind, however, that the magnetic equator is not the same as the geographic equator.)

Moderate levels of trans-equatorial propagation (TE) are expected; stations in the southern states and parts of the Caribbean will be able to work into the northern areas of South America during the late afternoon. During peak years of a solar cycle, October is one of the best months for TE activity, especially later in the month. Since we are in the tail end of the current solar cycle, these openings will be rarer than previous years, but some exciting openings might occur.

Look for TE openings after sunset, between 8p.m. and 11p.m., local time. TE is caused by a wrinkling in the ionosphere above the magnetic equator that causes a double hop on the ionosphere from one side of the equator to the other, over the magnetic equator. Signals from 14 MHz up to 430 MHz can be propagated in this way.

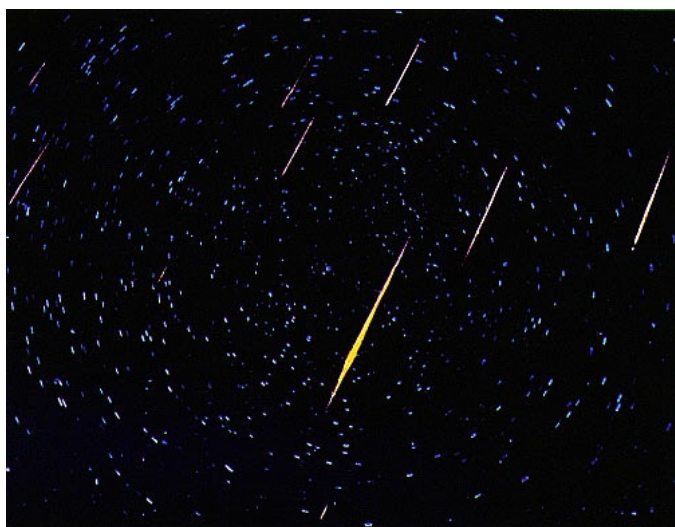
Sporadic-E activity is sparse during October in the northern Temperate Zone (where much of the U.S. is located). If a sporadic-E

opening should occur and link with a TE opening toward the south, expect a possible opening into Argentina, or even potentially into Australia and the South Pacific. A slight increase in Sporadic-E (Es) starts late in November and peaks in December, so keep your ears open for low-VHF (FM, TV carrier, and six-meter amateur) signals via this mode.

Quite a bit of meteor shower activity is expected in November and December, providing conditions for **meteor-scatter** openings on the VHF bands for distances up to about 1000 miles. When a meteor burns up in the atmosphere, its intense heat creates an ionized trail, making it possible for radio signals to propagate off of the ionized trail much like they would off of the ionosphere. Look for the November Leonids starting around mid-November. After the Leonids, check out the Geminid meteor shower in mid-December. Both of these showers provide great opportunity to experience VHF DX via the plasma vapor trails left by the intense heat caused by the meteor as it burns up in the atmosphere.

Meteor scatter propagation is a mode where radio signals are refracted off of these trains of ionized plasma. Because the height of these plasma trains is in the E layer of the ionosphere, the range of a meteor scatter contact is between 500 and 1300 miles. The frequencies that are best refracted are between 30 and 100 MHz. However, with the development of new software and techniques, frequencies up to 440 MHz have been used to make successful radio contacts off of these meteor trains.

Lower VHF frequencies are more stable, and last longer, off of these ionized trails. A six-meter contact may last from a second to well over a minute. The lower the frequency, the longer the specific "opening" made by a single meteor train. Conversely, a meteor's ionized train that supports a sixty-second refraction



The annual Leonid meteor shower (Courtesy NASA)

on six meters might only support one-second refraction of a two-meter signal. Special high-speed digital modulation modes are used on these higher frequencies to take advantage of the limited available time, like high-speed CW, in the neighborhood of hundreds of words per minute.

Write Me

Do you have questions about space weather and radio propagation? Do you have observations about MW DXing, or Meteor Shower propagation that you would like to share? Please write me an e-mail message or a letter.

I also invite you to check out my propagation resource center (including discussion forums) on the Internet at <http://prop.hfradio.org>. If you have a cellphone or other handheld device capable of reading WML, I have a WAP version of this resource center at <http://wap.hfradio.org>. You can even sign up for my propagation eAlert service for free. These propagation eAlerts keep you informed of the various index numbers, in real-time.

I wish you a happy radio-monitoring season!

NW7US, Tomas Hood
Nw7us@hfradio.org
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The New Ham's HF Station Check List

When the Federal Communications Commission dropped the Morse code requirement for the General Class license on February 23 of this year, the ranks of amateur radio in the U.S. swelled. Tens of thousands of new hams are surging onto the high frequency (HF) bands. Last month in this column I explained many of the general operating practices for the various modes and common net procedures. This month I'll go through a check list of things all hams (and not just beginners!) should have in their shacks.

❖ Where Are You and What Are You Doing?

Last year the FCC, with the advice of the American Radio Relay League, announced sweeping changes in the operating band segments on the HF bands. To avoid making illegal transmissions or at the least being a lid (bad) operator, you need to have a chart of the new band plan. The League has produced two such charts. The first is called "The U.S. Amateur Radio Bands" and is a graphic depiction of the various frequencies each class license is allowed to operate. The other is called "The Considerate Operator's Frequency Guide" which shows what modes are allowed and where. Both are available for download as .pdf files at www.arrl.org/FandES/field/regulations/bands.html and www.arrl.org/FandES/field/regulations/conop.html.

As you expand your operating activities you may find yourself wondering

what you can and can't do on the air. The arbiter of all ham radio legalities is a book called The ARRL/FCC Rule Book (\$12.95 from League HQ). This book runs 380 pages and is worth every dime. I'm always checking it out to see what the FCC allows and where. Included are explanations, in plain language, of Station Operation Standards, Special Operations, Technical Standards, and Emergency Communications among many others. There are thorough explanations of all transmission modes, and Q & A sessions about all manner of things most hams should know but don't.

❖ Put it in the Log!

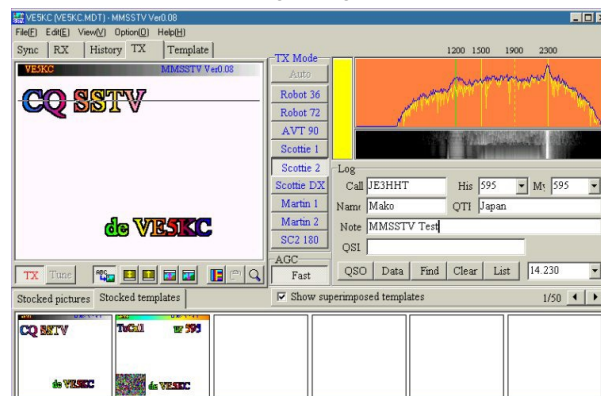
The FCC does not require hams to keep a paper log and many don't. Over the years I'm glad I have. But, it's inconvenient to rummage through a stack of spiral notebooks to figure out if I've worked a particular ham or DXCC entity. That's where an e-log comes in handy. E-logs are basic databases which allow the operator to record every contact

and then search the database for contacts in order to qualify for various awards. Most logging software lets you sort out which states you've worked, DXCC entities, and continents in CW, SSB, and RTTY modes. As the number of contacts mount it's the only way to keep track. An impressive list of logging software is found at this web site: www.ac6v.com/logging.htm. On this list are many SWL logging programs as well. Some programs are freeware, some have nominal charges, and most have active user groups to help you overcome initial problems. Programs are written for Macs, Windows, Linux and even DOS.

E-logging is the most useful way to log contacts, but could present a problem in the event of a hard drive crash or other calamity which befall our computers from time to time. You need to be able to back up all the

data you enter just in case. I have heard from more than a few hams about the thousands of contacts that were lost when their computers got fried in a lightning hit or wiped out in a crash.

It's still good practice to keep a legal pad and pen at your operating position and jot down your activities as you operate. Later you can enter them in a digital log and still have the basics in



Makoto Mori, JE3HHT's MMSSTV program for amateur slow scan TV. You can't believe how easy it is to copy SSTV on virtually any shortwave radio, portables included! (Courtesy: Makoto Mori JE3HHT)

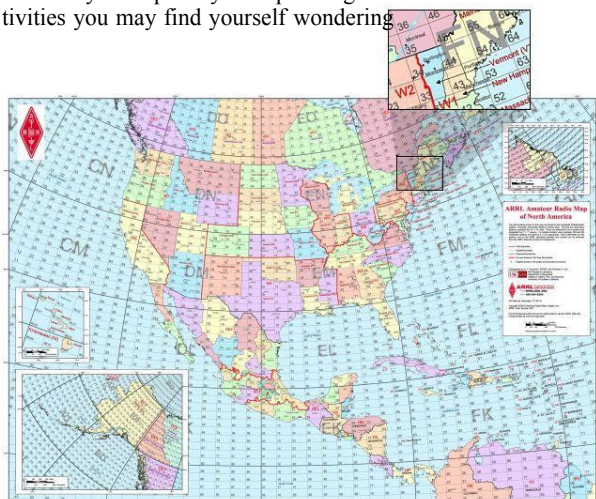
your hard copy notes or you can enter them in an old fashioned hard copy log such as the ARRL log book (\$7.95). A smaller version of the ARRL paper log is made for mobile operation.

Another great advantage to e-logging is that you can print QSL reports and address labels directly on QSL cards or on labels to be later affixed to the cards as you wrap up a contact. Keep the DX cards in a separate pile and send them via the bureau. Put stamps on the stateside cards and pop them into the mail.

❖ Digital Mode Software

While we're adding radio related software to the computer, let's put in something useful for both hams and SWLers. Digital mode software turns the deedles and screeches into actual words scrolling across your computer screen. Most current software programs do it all: CW, RTTY, PSK31 and SSTV. If you're just listening, this software virtually runs itself. If you're transmitting it takes all the guesswork out of operating.

A connection between the input and output of your computer's sound card and the speaker jack and mike input of your rig is all it takes to be ready for all modes. Download a simple software



This 27" x 39" Amateur Radio Map of North America is overlaid with grid squares. It's shipped in a mailing tube and costs only \$15. (Courtesy: ARRL Catalog)

program such as HamScope (www.qsl.net/ham-scope) and you'll be copying RTTY, CW, PSK31, MFSK, among others. I use it in conjunction with a TigerTronics Signalink Interface and have worked nearly 200 countries in just a few years in digital modes.

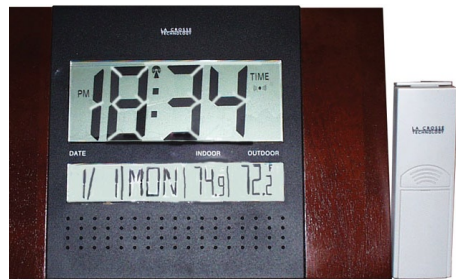
There are many such programs available for all manner of computer set-ups. Another digital mode program is MMSSTV, from Makoto Mori, JE3HHT, which is the SSTV engine for the HamScope program. This is another very easy to use program which will give you great results right away. Go here to download this program: <http://mmhamsoft.amateur-radio.ca/mmsstv>. This is also perfect for SWLers who just want to monitor the SSTV action on HF. Simply take the speaker output from your radio into the input of your sound card and watch the screen. According to the HamScope web site it does not support Windows Vista at this time.

❖ Where in the World is 3DA?

3DA is the prefix for the landlocked Kingdom of Swaziland, which is in the middle of southeastern South Africa. As you chase DX you'll learn more about geography than you ever did in school. One of the reasons for knowing the location of a place is so you'll know where to point your beam. Nearly every location on the globe has a "long path" and a "short path" to your own location. Sometimes propagation favors pointing the beam in the long path direction and sometimes short path works best. Of course, if you're operating a wire antenna the question of paths is moot. But, it's still fun to know where a place is.

The ARRL makes several maps especially for hams. The ARRL Map of North America shows all the states and provinces of the U.S., Canada and Mexico along with their various call districts. The ARRL Map of the World has the call sign prefixes for all the DXCC countries printed on each location. Both are \$15 from League HQ. I use a 12" globe which was bought during an "after Christmas sale" at a local Peace Frogs travel agency. It was going at half price and has a built-in light which turns it into a terrific lamp and also makes the fine print on the globe easy to read.

When I hear a call sign prefix that I don't recognize I go immediately to the official ARRL DXCC List (\$5.95) which is published frequently enough to update the current changes in call sign

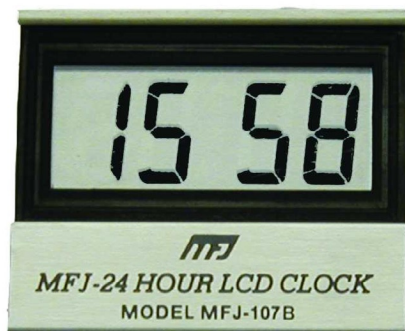


For a little more pizzazz check out this MFJ 134RC from LaCross Technologies for \$39.95. It's a quartz digital atomic clock set by WWV which also shows the date and indoor/outdoor temperatures via a wireless temperature probe. (Courtesy: MFJ Enterprise)

additions and deletions. For example, last year two new DXCC prefixes were added to the list: Montenegro (YT-YU, YZ) and Swain's Island (KH8). To have worked all available DXCC entities you now have to work 337. Over the years, 58 DXCC entities have been deleted. My favorite deleted prefix is KS4 (Swan Island) which was deleted when it was handed over to Honduras. Yes, the location made famous by the anti-Castro broadcasts of CIA-backed Radio Swan had the U.S. amateur prefix KS4 which the FCC rolled into its regular ham call sign list and which, by luck, I just happened to be assigned! An excellent DXCC Entity List may also be downloaded and printed from www.ng3k.com/Dxcc/dxcc.html.

❖ Where Did the Time Go?

I'm always amazed how quickly time goes whenever I'm engaged in on-air amateur radio or just monitoring the various bands as an SWLer. Every ham station and SWL listening post has to have a 24 hour clock set to GMT/UTC/Zulu or whatever else you want to call global time. Everything that's done in radio involves the clock. If you're an SWLer you need to know what time it is Zulu so you can tune in your favorite programs. Ham radio nets start and end on the clock. DX contacts have to be entered in your log and on the QSL cards in order to confirm contacts.



MFJ's model 107B. A simple 24 hour digital display quartz clock runs a very long time on a tiny watch battery. (Courtesy: MFJ Enterprises)

I wrote an article years ago on the subject of clocks in the shack, which covered everything from fancy store bought clocks to how to make your own (*MT, On The Bench* Jan. '05). One of the cheapest and most useful shack clocks I've found is the MFJ digital quartz 24 hour clock with 5/8" numerals (MFJ-107B) which sells for \$12.95. I've used one for nearly 20 years and have put no more than three or four watch batteries in it during that time. It keeps excellent time, is very easy to read from several feet away, and takes up little space on the desk.

❖ The Art of the QSL

For ham and SWLer alike, QSL cards are one of the most fun parts of the hobby. The power and ability of the personal computer now makes it possible for anyone to make professional looking QSL cards and reception report cards. With a little practice and some talent you can "roll your

WJ50/B

This card confirms with **Ken KS4ZR**
that the WJ50 beacon was operating at **18:26 Z**
on **16 June 2006** **19:26**
Thank You for the reception report.



The beacon has been in
continuous operation since
June 1992

73 de WJ50

2 W Vertical Antenna 28.289MHz Grid EL17

Bill

DIY QSL cards and reports are easy with the Windows Paint program. WJ50 sent me this reception report when he copied my 10 meter beacon at his location in southern Alabama. (Courtesy: Bill Hays WJ50)

own" QSLs (see below).

But, if you'd like to leave it up to the pros there are a huge number of companies printing quality QSL cards. Here are some things to know about printing costs: As the number of cards printed goes up the total cost rises but the cost per card is reduced dramatically. The addition of color photography not only adds interest to the appearance but also to the price of the final product. Glossy paper and thicker stock cards are usually more expensive than thin stock cards with a matte finish. Many European hams offer full color QSL printing at prices competitive with stateside companies. It really pays to shop around. If you plan to change your call sign or address in the near future, order a minimum of cards.

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Q. *Local cell towers are causing interference on my hand-held scanner. Would a shorter antenna help? (Chris Witczak, email)*

A. A shorter antenna might help, but because a short antenna is ideal for 800 MHz cell phone frequencies, it might actually make the situation worse, and would reduce reception on the lower frequencies (longer wavelength). I'd recommend instead an adjustable telescopic whip which can be set to a length which has less response in the cell bands while not compromising other frequency ranges. The Grove ANT-06 at \$16.95 is such an antenna, continuously adjustable from 6 to 29 inches.

Q. *Is it legal to rebroadcast on the Internet radio communications received on a broadcast radio, scanner, CB, FRS or milliwatt AM/FM station? (Dany Clum, KB2UUL, Jacksonville, FL)*

A. Certainly not FCC-licensed services like AM and FM broadcasters or communications services without their express written permission. I suspect, however, that unlicensed services like CB, FRS and Part 15 low-power AM and FM broadcasters would be OK. Reader input on this (or any other question) is certainly welcome.

Q. *I am receiving VHF overload signals on my shortwave portable from my local airport; how can I eliminate this interference? (Roger Henderson, Memphis, TN)*

A. Such interference is common on portables which are notorious for having limited dynamic range (overload immunity). If you are using an external antenna, that aggravates the problem. If you disconnect the external antenna and use only the whip, and the image goes away, this indicates that you are using too long an antenna wire.

Most portables do very well with only 10-20 feet of wire attached to the external antenna jack (don't connect the wire directly to the whip or signal overload is virtually certain).

You could put a 30 MHz (or so) low-pass filter in the antenna line to block reception of VHF signals. The well-respected PAR filters can be factory set to the aircraft band.

You might also want to try an experiment with an outdoor antenna. Assuming you have

a portable, make the antenna no more than about 20 feet long, break it at the center with an insulator, and connect coax (shield to one side, center conductor to the other element). Be sure it's horizontal rather than vertical, and mount it so the ends point toward the control tower for minimal pickup.

Q. *I am currently listening to my scanner using an indoor mobile whip and wonder if I should put a preamp on it for better reception, or put a simple outdoor scanner antenna like the Grove OMNI II outside my window? If outdoors, should I also use a preamp along with an adjustable RF attenuator to prevent overload? (Jeremy Wile, email)*

A. The OMNI II is a very good choice for an inexpensive scanner antenna and should certainly work better than anything you would have indoors; just be sure to feed it with coax. Of course, if you have metal siding, you would need to move it out at least two feet to avoid reflection problems, but other than that, it should work well for local area reception.

If you find then that most reception is quiet, and includes a few very strong locals, I wouldn't bother with a preamp which would likely cause overload problems like intermod.

Yes, an RF attenuator could be used to reduce signal strengths so they wouldn't overload the preamp, but that's kinda like buying a high-performance truck, then loading it with rocks so that it doesn't accelerate so fast! You're ALWAYS better off with the best antenna at the best location, then try preamps from there. If you get intermod overload problems no matter what you try, then an attenuator is a possibility, but it's better to first install a notch filter for the frequency of the interfering signal.

Q. *Will GMRS repeaters be affected by narrowbanding? (Richard Tarozzi, email)*

A. If the FCC requires the existing GMRS repeater to be narrowbanded, then yes, the equipment will have to be narrowbanded for performance equal to the original wider bandwidth system.

Narrowbanding requires a reduced bandwidth in the receiver of the repeater, and the receivers in the network as well, in order to properly extract the reduced deviation (FM modulation) of the incoming signal in order to provide adequate audio and signal-to-noise

ratio.

If a narrowband transmission is received by a wideband receiver, the extracted audio will be weak and the unoccupied bandwidth of the filtering will allow noise to come through that would interfere with weak signals.

Q. *Is the use of an external, tunable preselector really helpful for shortwave/longwave reception?*

A. Much depends upon the quality of the receiver. Inexpensive portables can use all the help they can get, while professional desk-top receivers probably don't gain much from the use of an external preselector unless they are being compromised by an unusually high (usually local) overload signal like a broadcaster.

If the incoming RF signal strength is within the dynamic range capability of the receiver's signal-handling ability, an external preselector does very little (if anything) to improve reception. Some argument can be made that the external preselector will reduce the receive bandwidth, thus reducing noise level, but selectivity is entirely dependent upon the IF stages of the receiver, not the RF stages.

Q. *My 2.4 GHz wireless network seems to suffer from periodic dropouts. Could this be interference? What are some things to look for?*

A. That portion of the spectrum is indeed becoming quite crowded. Do you hear or see any interference on your TV or other receiving equipment? Are the dropouts at specific locations? Are there obstacles in the way or other apparent antennas nearby? Have you tried swapping out equipment to see if it may be the hardware rather than the location? Does the interference happen at specific times of day or night? Some sources of interference could include:

- Defective microwave ovens
- Two-way radio overload or harmonics
- Plasma or arc welders
- 2.4 GHz cordless phones
- Other wireless networks nearby or on towers
- Wireless surveillance cameras or transmitters
- Microwave security systems
- Other wireless interlinks at your location

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. Mail your questions along with a self-addressed stamped envelope in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.)

Q. I really enjoyed your review of the Uniden 996T scanner. They have finally come out with one that has almost continuous coverage and will trunk just about every system. I have been waiting for something like this. I noticed that the new scanner does not receive the UHF television band. Do you know what the FCC is going to do with that band once TV switches to HD? (Dave Evelove, N7YSS Hockinson, WA via email)

A. Once everything is switched over to digital TV, this will open up 764-806 MHz (TV channels 63-69) for land mobile services including the new 700 MHz public safety band. The UHF TV frequency range that the 996 does not cover (512-764 MHz) will still be part of the TV broadcast service (channels 21-62) as digital TV channels.

Q. I noticed that on the 996 scanner, you could not program a delay for an individual channel, that it would affect all channels in the system. I think I read that correctly in the manual. So what if you want to program a bunch of channels into a conventional system, but only wanted some of them to have a delay? Would you have to program those channels into a separate system? This is, what I feel, is one of the weaknesses of the AOR scanner, ie not being able to program an individual channel with a delay. It's either all or nothing per bank. Otherwise, it looks like the new Uniden scanner is a real winner. (Dave Evelove, N7YSS Hockinson, WA via email)

A. You are correct in the way you have interpreted the instruction manual. I will show you below how I have my scanner programmed.

System 1 - North Carolina PS (Conventional)
Group 1 - Cherokee County
Individual Police, Fire and EMS frequencies
Group 2 - Clay County
Individual Police, Fire and EMS frequencies
Group 3 - Graham County

Individual Police, Fire and EMS frequencies
System 2 - Georgia PS (Conventional)
Group 1 - Towns County
Individual Police, Fire and EMS frequencies
Group 2 - Union County
Individual Police, Fire and EMS frequencies
System 3 - Tennessee County (Conventional)
Group 1 - Polk County
Individual Police, Fire and EMS frequencies
Group 2 - Bradley County
Individual Police, Fire and EMS frequencies
System 4 - NC VIPER (Motorola Trunk)
Freq Group 1 - Johanna Bald Site
Freq Group 2 - Wine Springs Group
System 4 Talkgroups
Talkgroup 1 - NC State Highway Patrol
Talkgroup 2 - Special Events

The loadout sample above is what I have programmed in my Uniden 396/996. I can set a delay of one to five seconds for each of the conventional "groups" noted above, but as you pointed, not the "individual frequencies." I can also set a specific amount of time that the scanner will scan (aka "hold on") on a conventional "system" (up to 255 seconds) before moving on to the next system. I can also set this same system hold for each trunk system "site" (i.e. Johanna Bald, Wine Springs, etc.) in each of my trunk systems.

When it comes to trunk systems, I can only set a delay for each system (i.e. NC VIPER, etc), but not for each individual talkgroup.

As for the rationale of not allowing a delay to be set for each individual channel, you will have to ask Uniden that question.

Q. I am a member of a radio control airplane flying club and we are having interference problems in the 72 MHz portion of the band. Could you enlighten me and the club about what else is in that spectrum? (Barry Williams, Auburn, Alabama)

A. I did some research on the 72 and 75 MHz radio control frequency assignments and they are, in fact, unique to this service under Part 95 of the FCC rules. RC radio frequencies are located on frequencies such as 72.01, 72.03...72.99 etc. Licensed FCC stations in these frequency ranges operate on 72.02, 72.04...72.98 MHz assignments. While it's true that there are no fixed station assignments on the RC frequencies, depending on the RC receiver design it could receive co-channel interference. In fact, here is a statement written in Part 95 regulations in regard to RC causing interference to the fixed license operations in the 72 MHz band:

Stations in the 72-76 MHz range are subject to the condition that interference will not be caused to the remote control of industrial equipment operating on the same or adjacent frequencies or to the reception of television transmissions on Channels 4

and 5. These frequencies are not afforded any protection from interference due to the operation of fixed and mobile stations in other services assigned to the same or adjacent frequencies...

So there is the caveat from the FCC: If the RC receiver filter design is not tight (bandwidth greater than, say, 12.5 kHz either side of one of your RC center frequencies) and there is a powerful 72/75 MHz pager in the area, it could cause harmful interference to your radio control aircraft operation. It would all depend on the local RF environment and the RC receiver design.

As for 75 MHz, the same pretty much applies, except there is a caveat on its usage as an RC frequency in Part 95:

The 75 MHz channels may only be used to operate a model surface craft device.

The most revealing part of these caveats is in the FCC Table of Allocations Note NG56:

NG56 In the bands 72.0-73.0 and 75.4-76.0 MHz, the use of mobile radio remote control of models is on a secondary basis to all other fixed and mobile operations. Such operations are subject to the condition that interference will not be caused to common carrier domestic public stations, to remote control of industrial equipment operating in the 72-76 MHz band, or to the reception of television signal on channels 4 (66-72 MHz) or 5 (76-82 MHz). Television interference shall be considered to occur whenever reception of regularly used television signals is impaired or destroyed, regardless of the strength of the television signal or the distance to the television station.

Basically, RC activity in this band is a secondary service.

Based on all this, you could get interference from the regular users of these two bands. It might be a good idea for RC clubs to purchase scanners that cover these two frequency ranges to monitor the local RF environment on the site where you are going to fly your aircraft to detect potential interference problems. That would be a small price to pay compared with losing one of your RC aircraft or ships.

Q. In last month's column I had this question: My Uniden 246T, while ID scanning my local Public Safety, seems to skip every few seconds after conversation begins on the channel. Is this due to a setting? (Chris Witczak via email)

A. After thinking about my original answer, I am going to amend it a bit. There are actually three things that could cause the scanner to skip. If you hear a skip every two seconds on conventional or trunk systems, then you have your Close Call™ initiated. If you hear a skip every two seconds on conventional channels only, then you have your priority channel function selected (as outlined in my September column). And if you hear a skip every five seconds on any system, then you have your weather monitor function selected on the scanner.

Mining the Scanner Manual

Sometimes the manual that comes with a scanner just doesn't answer all the questions you might have. This month we dig a little deeper into the capabilities of modern scanners and address reader questions that aren't covered in the owner's guide.

❖ Peachtree City, Georgia

Hi Dan,

I purchased a Radio Shack Pro 97 scanner for the purpose of monitoring my local fire department transmissions. I am a volunteer firefighter in Peachtree City, Georgia, and was issued a pager that receives only the initial dispatch call; I needed the scanner to follow the ensuing conversation as I travel to the call. I programmed my PRO97 to pick up my fire department's conversations on our city's trunked frequencies; however, I'm sure there are still ways to utilize the scanner better.

I believe I have programmed the scanner adequately, however I still have many questions. Therefore I would like to know more about how to utilize my scanner – not just the basics – and my instruction manual is poorly written (my opinion) and extremely lacking in information (including the Radio Shack help number I called). This is why I am asking you for a source of expert information.

Here are just some sample questions I have:

Are "users" the same as "ID's"?

What is the purpose of sub-banks and how should I best utilize the storage locations of the identities, frequencies, etc.?

I use one bank in the closed mode for my Fire Department talkgroup, and I also use the same frequencies in another bank so I can keep that bank open, but that bank will not scan—it gets "stuck" on the control frequency.

Sometimes when scanning the trunked frequencies, the scanner gets stuck on a particular ID (32400? - which isn't on the list I found when I looked for the various frequencies and talkgroup ID's on the Internet) and all I hear is a noise like it's some kind of control thing.

This scanner has piqued my interest and I'd like to know more about various trunking modes, and in general, how the various communications systems work nowadays.

Thanks, Ed in Georgia

Peachtree City is a town of about 30,000 in Fayette County, located about 30 miles southwest of Atlanta. The county operates a Mo-

torola Type II trunked radio system, on which Peachtree City public safety agencies operate. The system uses the following frequencies: 866.3750, 866.6875, 866.9000, 866.9250, 867.7500, 867.9250, 868.4625, 868.7500, 868.9000 and 868.9750 MHz.

Known talkgroups include:

Dec	Hex	Description
48	003	Sheriff Dispatch 1
80	005	Sheriff Dispatch 2
112	007	Sheriff Dispatch 3
144	009	Sheriff Administration
176	00B	Sheriff Command
208	00D	Sheriff Traffic
240	00F	Sheriff Warrants
272	011	Sheriff Courts
304	013	Sheriff Traffic
336	015	Sheriff Jail
432	01B	Sheriff Special Operations
528	021	County Emergency
2576	0A1	Fire and Emergency Medical Services (Dispatch)
2608	0A3	Fire and Emergency Medical Services Administration
2640	0A5	Fire and Emergency Medical Services Command
2704	0A9	Fire and Emergency Medical Services Tactical 1
2736	0AB	Fire and Emergency Medical Services Tactical 2
2768	0AD	Fire and Emergency Medical Services Tactical 3
4688	125	County Public Works (Dispatch)
4720	127	County Road Crew
4880	131	Animal Control
4912	133	Animal Control
7056	1B9	Water Department
7312	1C9	Peachtree City Police
7334	1CA	Peachtree City Police
8336	209	Peachtree City Fire (Dispatch)
8368	20B	Peachtree City Fire (Tactical 1)
8400	20D	Peachtree City Fire (Tactical 2)
8432	20F	Peachtree City Fire (Tactical 3)
8464	211	Peachtree City Fire (Tactical 4)
8496	213	Peachtree City Fire (Training)
9392	24B	Criminal Investigations Division (CID)
9936	26D	County Schools
31842	7C6	Emergency Management Agency
31856	7C7	Emergency Management Agency
31888	7C9	Mutual Aid 1
31920	7CB	Mutual Aid 2
31952	7CD	Mutual Aid 3
32272	7E1	Hazardous Materials Response



LTR trunked systems as well as conventional transmissions. It is not capable of monitoring APCO Project 25 digital voice conversations.

Ed is not the only PRO-97 owner to come to the conclusion that the factory manual is less than satisfactory. One source for a more clearly written manual can be found on the World Wide Web at myweb.cableone.net/marksscanners/97/97.html. There you will find an "Easier to Read" scanner manual for the PRO-97.

Users of the trunked radio system are police, firefighters, and other personnel given a radio by a public safety agency. Each of these radios is programmed with one or more talkgroup identifiers (IDs), making the radio a "member" of that group. When a member of a talkgroup transmits, the trunked system rebroadcasts that transmission – along with the talkgroup identifier – to all other radios in the coverage area. The system also broadcasts a message on the control channel, indicating that the talkgroup is active on a particular voice frequency. Any radio that has been programmed to be a member of the talkgroup will automatically switch to the voice frequency and become a listener to the transmission. So, in short, users can be members of one or more talkgroups (which are referred to by an identifier or ID).

❖ PRO-97 Memory

The PRO-97 contains two separate memory areas, one for channel (frequency) data and another for talkgroup identifiers. There are ten channel memory banks, each capable of holding 100 frequencies. For each of the ten channel memory banks there is also a corresponding ID memory bank, which holds a list of talkgroup identifiers. Each ID memory bank is organized into five "sub-banks." Each of these sub-banks can hold 30 identifiers. Therefore, each bank can hold 150 identifiers, and the entire scanner can hold as many as 1,500 individual talkgroup identifiers.

The ID memory sub-banks are used to control whether the scanner will stop when it detects activity associated with a particular talkgroup. For instance, if you normally listen to all the activity in your town and suddenly a "hot pursuit" police chase starts, you probably want your scanner to follow only police talkgroups and ignore other activity until the chase is resolved.

When the PRO-97 is scanning a trunked system, it can operate in one of two modes, either "Open" or "Closed." In open mode, when the scanner detects a trunked transmission it

The PRO-97 is a handheld trunk-tracking scanner built by GRE and sold through Radio Shack. It is able to scan Motorola, EDACS and

stops scanning, displays the active talkgroup ID, and plays the audio. In closed mode, the scanner first checks the active talkgroup identifier against the IDs that have been stored in memory. Only if the active talkgroup appears in the ID memory will the PRO-97 stop scanning.

Because the PRO-97 allows you to turn sub-banks on and off (see page 76 of your manual), you are able to control whether the scanner will stop when it detects activity on a particular talkgroup. In the police chase, for example, you would switch the PRO-97 to closed mode (see pages 26 and 27 of your manual) and turn on only the sub-bank with police-related talkgroup identifiers.

In addition to turning entire sub-banks on and off, the PRO-97 gives you the ability to turn on and off individual talkgroup identifiers. This is referred to as *locking out* a talkgroup (page 77 of your manual) and is a more fine-grained way of controlling whether your scanner will stop when a specific talkgroup is active. If the scanner is in closed mode and the active talkgroup ID is stored in memory but locked out, the scanner will not stop. This allows you to avoid activity on talkgroups that might otherwise interrupt your scanning.

If you find that your scanner is getting stuck on what sounds like a control channel (a harsh buzzing noise), there are a couple of possibilities. One is that it is a channel carrying some kind of digital data, either from a digital radio or a mobile computer. If your scanner is displaying a consistent talkgroup ID when you hear the noise, it may simply be a talkgroup assigned to some other purpose than carrying analog voice.

If the scanner is getting "stuck" on a control frequency, you can use the "Control Channel Only" feature of the PRO-97 to help you out. In a Motorola trunked radio system, control channel messages contain information about active talkgroups and on what particular channels they can be heard. The PRO-97 can use these messages to determine the actual voice frequency for each active talkgroup. By using this capability, you do not have to enter each and every voice system – just program the control channel frequencies and let the scanner figure out the rest.

More help is available on the Internet. The Yahoo! group dedicated to the PRO-97 scanner can be found at groups.yahoo.com/group/Pro-97/. This group has more than 3,700 members and a number of files for download, so you will have a large resource base to draw from. Similar groups exist for other scanner models to help you "go beyond" the manual.

❖ Glenwood Springs, Colorado

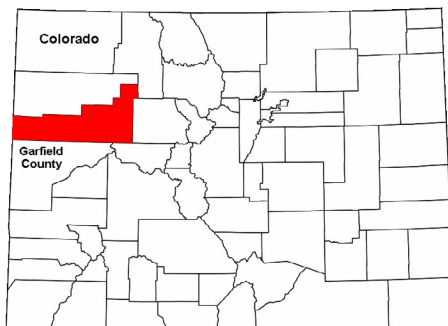
Hello Dan,

I have a question regarding the stock antenna for the Uniden BCD396 that I have recently purchased. Basically, from your experience I was wondering if the stock antenna was suitable for this unit or should I pick up a better one? I live in Glenwood Springs, Colorado,

and am getting back into the hobby. I will have to relearn everything as this scanner is all new to me, since the last one I had was from Radio Shack back in the late 1970s early 1980s. It ran on four channels and I needed to buy crystals for it every time I moved. My new unit has not yet arrived and I am excited to get back into listening. If you have any thoughts, please let me know.

Thank you, Jim in Colorado

Glenwood Springs is town of nearly 9,000 residents located about 150 miles west of Denver, where the Roaring Fork River joins the Colorado River. History buffs may recognize it as the final resting place of Doc Holliday, one of the gunfighters from the 1881 shootout at the O.K. Corral in Tombstone, Arizona. Glenwood Springs is located in Garfield County, on the western edge of Colorado.



It appears that the local frequencies in use are mostly in the 150 MHz band:

Frequency Description

153.935	County Jail
154.130	Glenwood Springs Fire Department
155.025	Sheriff
155.070	Sheriff (Coal Ridge, Sunlight Peak, Lookout Mountain)
155.160	Search and Rescue
155.190	Sheriff (Lookout Mountain, Sunlight Peak)
155.685	Glenwood Springs Police
155.805	County Dispatch
159.030	Glenwood Springs Police (Dispatch)
460.625	Search and Rescue Dispatch

Scanners have come a long way since the days of plug-in crystals. Handheld units like the BCD396T use frequency synthesizers instead of crystals and are capable of covering many more frequencies across a much wider bandwidth. They can also be interfaced with personal computers, allowing you to organize and program the scanner via the convenience of software program rather than the keypad.

Antennas, too, have improved with time. Although the stock antennas that come with modern scanners aren't terrible, they do represent a compromise in performance across the various frequency ranges. The one-size-fits-all stock antenna may be adequate in some bands but probably won't do really well in any one of them. Depending on the particular band of interest, an after-market antenna might provide better reception.

For instance, if you decide you're most interested in listening to radio transmissions in

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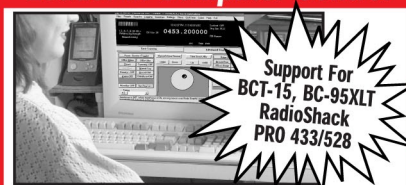
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the 800 MHz band, Radio Shack sells an excellent replacement antenna, part number 20-283, which is designed for better performance in the 800- and 900-MHz ranges.

Some antennas combine performance in various bands, such as the Comet SMA-3, which works well for frequencies around 150 MHz, 450 MHz, and 900 MHz.

Another antenna to consider is the Diamond RH77CA, which also works well at 150 MHz and 450 MHz frequencies. However, it is significantly longer than the standard antenna, so you'll want to be sure that won't create any problems for you.

One thing you'll need to keep in mind with any replacement antenna is having the proper connector to physically match the antenna with the scanner. Be sure that the antenna you're looking at will mate with the connector on your scanner. Popular connector types include BNC and SMA. If the two don't match, it will be necessary to use a small adapter to make things fit together properly. In fact, some scanner listeners who change antennas on a regular basis use an adapter anyway, in order to reduce the amount of wear and tear on the scanner itself.

❖ Canadian Frequencies

Dan,

I found your e-mail by an "Understanding Trunking" article you wrote a while back to Mike from Petosky. I hoped to figure out if I'd be able to locate the frequency of the local Police here in Deux-Montagnes, Quebec, Canada. Deux-Montagnes is the name of the town, in English it means "two mountains" in case you don't speak French.

I recently purchased a Uniden BC72XLT and have since been able to hear police from surrounding towns but still have yet to get the local Deux-Montagnes Police frequency.

Mike in Canada

Deux-Montagnes is a town of about 17,000 located in the Laurentides area of the Canadian province of Quebec. I don't have many records for active frequencies for that region, although Surete du Quebec is reported to be using 166.635 and 166.680 MHz in the Deux-



Montagnes area. You can also check 412.2375 MHz for the Deux-Montagnes Fire Department. There is an older report of a regional trunked radio system, perhaps an EDACS network, operating on 866.3125, 866.8125, and 867.3125 MHz. Perhaps using the search feature of the BC72XLT would confirm these frequencies and yield additional activity.

Are there any readers in the Deux-Montagnes area who might have more current information?

❖ Spring Hill, Florida

Hello, Mr. Veeneman,

I live in Spring Hill, Florida. I was wondering if you might have any information or point me in the right direction. I am monitoring the 800 MHz trunked system for Hernando County, including the Sheriff, Fire, and Emergency Medical Services. Over the last few days I have not been picking up very many transmissions. All my radios and antennas are in working order. I was wondering if they could have moved to or are testing a new digital system? I have not read in the newspaper or heard anything on television about this. Any help you might be able to give me would be greatly appreciated.

Tom in Florida



Spring Hill is home to about 80,000 people and is located in Hernando County, Florida, about 40 miles north of Tampa. The county operates a Motorola Type II trunked radio system on the following frequencies: 852.3375, 853.3375, 854.9875, 855.9875, 856.4875, 856.9875, 857.4875, 858.4875, 859.4875 and 860.4875 MHz.

Talkgroups on the system include:

Dec	Hex	Description
336	015	County Fire Tactical
368	017	County Fire Tactical
400	019	County Fire Tactical (Hazardous Materials)
432	01B	County Fire Tactical
464	01D	County Fire Tactical
496	01F	County Fire
520	020	Air Operations 2
1488	05D	Medical Helicopter 1
1520	05F	Medical Helicopter 2
1616	065	County Emergency Management Agency
2096	083	Animal Control
2256	08D	Parks and Recreation
2928	0B7	Waste Disposal
4016	0FB	Sheriff (Dispatch)
4048	0FD	Sheriff (Car-to-Car)

4112	101	Sheriff (Administration)
4144	103	Sheriff (Special Assignments)
4176	105	Sheriff (Tactical)
4240	109	Special Weapons and Tactics
4272	10B	Sheriff
4368	111	Explorer Scouts
4400	113	Sheriff
4432	115	Wants and Warrants Checks
4496	119	Sheriff
4528	11B	Sheriff (Surveillance)
4976	137	County Fire
5008	139	County Fire
5040	13B	Spring Hill Fire/Police
54272	D40	County Mutual Aid 1
54784	D60	County Mutual Aid 2
55808	DA0	County Mutual Aid 3
60928	EE0	County Dispatch
62976	F60	County Emergency 1
63488	F80	County Emergency 2
64000	FA0	County Emergency 3
64512	FC0	County Emergency 4
65024	FE0	County Emergency 5

There are also a number of conventional frequencies in use in the county:

Frequency Description

154.2350	County Fire Dispatch (Linked to trunked system fire talkgroup)
154.4150	Fire/Rescue Dispatch (Linked to trunked system fire talkgroup)
155.0850	County School Buses
852.3375	Fire/Rescue (Tactical 1)
853.3375	Fire/Rescue (Tactical 2)
463.0750	County Medical Coordination
463.0625	Ambulance to Brooksville Regional Hospital
463.0125	Ambulance to Oak Hill Hospital
463.1625	Ambulance to Spring Hill Regional Hospital

The first thing to check would be that you have all of the listed frequencies programmed into your scanner. If you're using a "Control Channel Only" method of tracking, be sure that you have all of the control channels programmed. It is normal practice to change the active control channel on a daily basis, in order to spread the wear on the equipment. If you're missing one of the control channels, you'll certainly miss a lot of activity.

One way you can double-check your receiving equipment is to listen to another scanner in the same area. Fortunately, a live, on-line scanner for Hernando County is available at www.hernandoliving.com/scanner.shtml. Depending upon your location in relation to the on-line scanner, you should be able to hear the same transmission both your own scanner and via your computer's speakers.

That's all for this month. More information is available on my web site at www.signalharbor.com, including links and additional scanner performance data. Please continue to send your questions, comments and frequency lists to me at danveeneman@monitoringtimes.com. Until next time, happy scanning!



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Manufacturer suggested list price \$299.95
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250 Channels • 5 banks • PC Programmable
Size: 7.06" Wide x 6.10" Deep x 2.44" High

Frequency Coverage: 25,000-54,000 MHz., 108,000-174,000 MHz., 400,000-512,000 MHz., 806,000-956,000 MHz., 849,0125-868,9950 MHz., 894,0125-956,000 MHz.

The Bearcat BCT8 scanner, licensed by NASCAR, is a superb preprogrammed 800 MHz trunked highway patrol system scanner. Featuring TrunkTracker III, PC Programming, 250 Channels with unique BearTracker warning system to alert you to activity on highway patrol link frequencies. Preprogrammed service searches makes finding interesting active frequencies even easier and include preprogrammed police, fire and emergency medical, news agency, weather, CB band, air band, railroad, marine band and department of transportation service searches. The BCT8 also has preprogrammed highway patrol alert frequencies by state to help you quickly find frequencies likely to be active when you are driving. The BCT8 includes AC adapter, DC power cable, cigarette lighter adapter plug, telescopic antenna, window mount antenna, owner's manual, one year limited Uniden warranty, frequency guide and free mobile mounting bracket. For maximum scanning enjoyment, also order the following optional accessories: External speaker ESP20 with mounting bracket & 10 feet of cable with plug attached \$19.95. Magnetic Mount mobile antenna ANTMMBNC for \$29.95.



Bearcat® BCD396T Trunk Tracker IV

Suggested list price \$799.95/CEI price \$519.95

APCO 25 9,600 baud compact digital ready handheld TrunkTracker IV scanner featuring Fire Tone Out Paging, Close Call and Dynamically Allocated Channel Memory (up to 6,000 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.40" Wide x 1.22" Deep x 5.35" High

Frequency Coverage:

25,000-512,000 MHz., 764,000-775,9875 MHz., 794,000-823,9875 MHz., 849,0125-868,9765 MHz., 894,0125-956,000 MHz., 1240,000 MHz - 1300,000 MHz.

The handheld BCD396T scanner was designed for National Security/Emergency Preparedness (NS/EP) and homeland security use with new features such as **Fire Tone Out Decoder**. This feature lets you set the BCD396T to alert if your selected two-tone sequential paging tones are received. Ideal for on-call firefighters, emergency response staff and for activating individual scanners used for incident management and population attack warning.

Close Call Radio Frequency Capture - Bearcat exclusive technology locks onto nearby radio transmissions, even if you haven't programmed anything into your scanner. Useful for intelligence agencies for use at events where you don't have advance notice or knowledge of the radio communications systems and assets you need to intercept. The BCD396T scanner is designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS, LTR and EDACS analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. **Dynamically Allocated Channel Memory** - The BCD396T scanner's memory is organized so that it more closely matches how radio systems actually work. Organize channels any way you want, using Uniden's exclusive dynamic memory management system. 3,000 channels are typical but **over 6,000 channels are possible** depending on the scanner features used. You can also easily determine how much memory you have used and how much memory you have left. **Preprogrammed Systems** - The BCD396T is preprogrammed with over 400 channels covering police, fire and ambulance operations in the 25 most populated counties in the United States, plus the most popular digital systems. **3 AA NiMH or Alkaline battery operation and Charger** - 3 AA battery operation - The BCD396T includes 3 premium 2,300 mAh Nickel Metal Hydride AA batteries to give you the most economical power option available. You may also operate the BCD396D using 3 AA alkaline batteries. **Unique Data Skip** - Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. **Memory Backup** - If the battery completely discharges or if power is disconnected, the frequencies programmed in the BCD396T scanner are retained in memory. **Manual Channel Access** - Go directly to any channel. **LCD Back Light** - A blue LCD light remains on when the back light key is pressed. **Autolight** - Automatically turns the blue LCD backlight on when your scanner stops on a transmission. **Battery Save** - In manual mode, the BCD396T automatically reduces its power requirements to extend the battery's charge. **Attenuator** - Reduces the signal strength to help prevent signal overload. The BCD396T also works as a conventional scanner to continuously monitor many radio conversations even though the message is switching frequencies. The BCD396T comes with AC adapter, 3 AA nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, SMA/BNC adapter, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO or ESAS systems. Order on-line at www.usascan.com or call 1-800-USA-SCAN.



Bearcat® BC246T Trunk Tracker III

Suggested list price \$399.95/CEI price \$214.95

Compact professional handheld TrunkTracker III scanner featuring Close Call and Dynamically Allocated Channel Memory (up to 2,500 channels), SAME Weather Alert, CTCSS/DCS, Alpha Tagging. Size: 2.72" Wide x 1.26" Deep x 4.6" High

Frequency Coverage:

25,000-54,000 MHz., 108,000-174,000 MHz., 216,000-224,9800 MHz., 400,000-512,000 MHz., 806,000-823,9875 MHz., 849,0125-868,9875 MHz., 894,0125-956,000 MHz., 1240,000 MHz - 1300,000 MHz.

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ID, custom search range, and S.A.M.E. group using 16 characters per name. **Memory Backup** - When power is lost or disconnected, your BC246T retains the frequencies that were programmed in memory. **Unique Data Skip** - Allows the BC246T to skip over unwanted data transmissions and birdies. **Attenuator** - You can set the BC246T attenuator to reduce the input strength of strong signals by about 18 dB. **Duplicate Frequency Alert** - Alerts you if you try to enter a duplicate name or frequency already stored in the scanner. **22 Bands** - with aircraft and 800 MHz. The BC246T comes with AC adapter, 2 AA 1,800 mAh nickel metal hydride batteries, belt clip, flexible rubber antenna, wrist strap, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. For more fun, order our optional deluxe racing headset part #HF24RS for \$29.95. Order now at www.usascan.com or call 1-800-USA-SCAN.

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Spooky Communications

Although our Halloween column is focused on “spooks” (spies and various clandestine activities), that doesn’t mean they get the rest of the year off. Clandestine ops are year-round activities. This summer revealed some major changes in one of the most reliable operations: the Israeli Phonetic Alphabet Station (E10).

First, a word of explanation: Designators like “E10” and other such odd-looking alphanumeric help numbers listeners keep track of the weird zoo of funny-sounding stations out there. The letter stands for the language used. “E” is English, “G” is German, “S” is Slavic languages, and “V” is everything else. Morse code stations are “M,” and things they haven’t quite figured out yet are “X.”

There’s a whole classification system, courtesy of ENIGMA 2000, an online incarnation of the European Numbers Intelligence Gathering and Monitoring Association. Those who are really into this stuff will want to check out the ENIGMA newsletters, which are online at Ary Boender’s site (<http://home.luna.nl/~ary/>).

E10 is a really cool-sounding station, if a bit unsettling. It’s known to come from Israeli intelligence. The major questions concern just what agency makes these broadcasts, and where the transmitters are. Some are amazingly loud in places where they really shouldn’t be if they’re located in Israel.

The broadcast uses the typical digitized female “numbers” voice, which speaks English using military radio phonetics (Alpha, Bravo, etc). Whoever recorded the characters had kind of a strange accent. Modulation is upper side-band (USB) or sometimes plain old amplitude modulation (AM).

After about a year of pretty concentrated listening, ENIGMA 2000 was well on its way toward a definitive time/frequency schedule for E10. Unfortunately, at least for hobbyists, most of it changed in July. High-volume callups/identifiers, which rotate messages frequently, are the same, but everything else is different. Some of the low-volume callups (like CIO, MIW, SYN, and VLB) appear to be gone. The medium-volume ones have changed frequencies, often lower. Given our bottom-of-cycle solar conditions, this would make sense.

CIO, MIW, SYN, and VLB were often heard with abnormally long callups. These peaked last year, before the

unpleasant doings in Lebanon, but at press time they remain in a long absence. Meanwhile, the “ABC” test identifier has become more frequent. Finally, a completely new “HNC” callup has been added. This would indicate that E10 has a few more surprises left.

We’ll have frequencies when more is known. Right now, it’s a work in progress, and it’s ENIGMA 2000’s work. If you want to follow it, keep checking their weekly updates at www.cvni.net/radio/.

❖ Long EAMs Aren’t Spooky

Last June, we had one of those rumor flaps the Internet does so well. Someone must be reading our utility mailing lists. The breathless, widely-circulated speculation mentioned how a network of “radio amateurs” (that’s us) reported a burst of activity on the US Air Force’s High-Frequency Global Communications System (HF-GCS).

What really got people going was mention of a US military Emergency Action Message (EAM) with 174 characters. This is much longer than the usual 32 or so. It was asserted (erroneously, as it turns out), to be the longest EAM since Operation Desert Storm.

As one of the “radio amateurs,” I kept thinking I’d seen recent reports of other long EAMs. I went back through old logs. These quickly revealed a monthly exercise that generated equally long EAMs, usually on a Saturday.

Jeff Haverlah, a regular *Utility Logs* contributor who listens in Texas, has been following this stuff as long as I can remember. I can trust him to get it right. He shows that 11175 kHz USB had EAMs of 163 and 248 characters in February of 2007. March had one of 201 characters.

April had 245. May had 202, and so on. The June intercept was completely typical. It was far from the longest this year, let alone since the first Gulf war. There have been longer ones since.

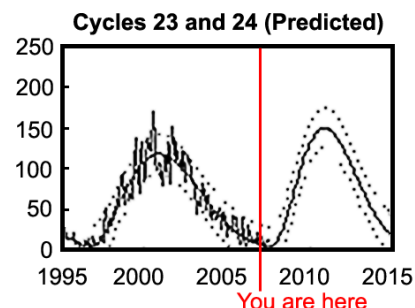
The thing to remember about EAMs is that they are urgent, encrypted traffic from the highest command levels of the US military, but nearly all of them are completely routine. Others are for exercises, and while these might have involved pretty apocalyptic scenarios, it’s still just training.

Sometimes it just doesn’t pay to imagine too much about stuff coming out of the radio.

With that caution, anyone else wanting to be one of the “radio amateurs,” too, can listen for all this on the HF-GCS frequencies of 4724, 6739, 8992, 11175, 13200, and 15016 kHz USB.

❖ Has Cycle 23 Bottomed?

We are currently in the 23rd “solar cycle” since these started being numbered. The activity indicators (sunspot numbers and radio flux) peak approximately every 11 years. Due to polarity reversals, the peaks occur in pairs, like negative and positive halves of a sine wave, so a full circle



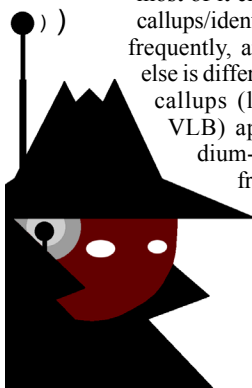
is 22 years.

You might have noticed that radio conditions really aren’t very good lately. They haven’t been for a few months now. Sunspots have become quite rare. The daily radio fluxes are hard put to get above 70 solar flux units. Since 90 is about where things really start happening on short wave radio, that’s pretty weenie. The smoothed averages also seem to be bottoming out, though we won’t be sure for several more months.

The people who study such things are predicting that these smoothed numbers will go just a wee bit lower (not enough to notice on the radio). They’re expecting the absolute bottom to be reached around the end of this year, and then the next cycle (number 24) will begin in spring of 2008.

Since these cycles rise a lot faster than they fall, things should start picking up pretty fast on the utility bands. The consensus of predictions for Cycle 24 expects a higher peak than 23, but below the spectacular levels of Cycle 22. However, any phenomenon as chaotic as sunspots won’t follow the rules completely. The only thing for sure is that some major surprises await. They always do.

You can get the full predictions for the impending transition to Cycle 24 at www.sec.noaa.gov/SolarCycle/.



ABBREVIATIONS USED IN THIS COLUMN

AFB.....	Air Force Base
ALE.....	Automatic Link Establishment
AM.....	Amplitude Modulation
ARQ.....	Automatic Repeat reQuest
AWACS.....	Airborne Warning And Control System
CAMSLANT.....	Communication Area Master Station, Atlantic
CW.....	On-off keyed "Continuous Wave" Morse telegraphy
DEA.....	US Drug Enforcement Administration
DHFCs.....	UK Defence High-Frequency Communications Service
E03.....	UK M16/SIS, musical callup and female voice
E10.....	Israeli intelligence/military, female phonetic voice
E11.....	Unknown "Strich" family, null-message format in English
EAM.....	Emergency Action Message
FAX.....	Radiofacsimile
FEC.....	Forward Error Correction
FEMA.....	US Federal Emergency Management Agency
FM.....	Frequency Modulation
HF-GCS.....	High-Frequency Global Communication System
JSTARS.....	Joint Surveillance Target Attack Radar System
LSB.....	Lower Sideband
M08a.....	Cuban 3-msg CW/MCW, ANDUWRIGHT = 1-0
MARS.....	Military Affiliate Radio System
Meteo.....	Meteorological (weather office)
MX.....	Russian single-letter CW cluster propagation beacons
RTTY.....	Radio Teletype
S11a.....	Slavic "Strich" family numbers, ends "konyets"
SITOR-A.....	Simplex Telex Over Radio, ARQ teleprinting mode
SITOR-B.....	Simplex Telex Over Radio, FEC teleprinting mode
Unid.....	Unidentified
US.....	United States
USCG.....	United States Coast Guard
UK.....	United Kingdom
V02a.....	"Atencion" Spanish numbers, 3-msg format

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations have their ENIGMA (European Numbers Information Gathering and Monitoring Association) designators in ().

- 365.5 BC-Non-directional aero beacon, Brasschaat, Belgium, CW at 2121. (Ary Boender-Netherlands)
- 366.0 KM-Non-directional aero beacon, Kalmar, Sweden, CW at 2121. (Boender-Netherlands)
- 1704.0 OXZ-Lyngby Radio, transmitter at Skamlebaek, Denmark, with voice navigational warnings at 2136. (Boender-Netherlands)
- 1734.0 OXZ-Lyngby Radio, Blavand, Denmark, warnings at 2140. (Boender-Netherlands)
- 1758.0 OXZ-Lyngby Radio, Skagen, Denmark, warnings at 2142. (Boender-Netherlands)
- 1890.0 PBK-Netherlands Coast Guard, weather at 2148. (Boender-Netherlands)
- 2252.0 Bravo Foxtrot-US Navy, Link-11 coordination net with Hotel and Oscar, at 0623. (Mark Cleary-SC)
- 2463.0 IGJ42-Italian Navy, RTTY marker and traffic at 2125. (Boender-Netherlands)
- 2474.0 PBB-Dutch Navy, Den Helder, Holland, RTTY channel status at 2122. (Boender-Netherlands)
- 2608.5 FUG- French Navy Toulon, RTTY "voyez le brick" test loop at 0600. (Boender-Netherlands)
- 2609.0 FUG-French Navy, "voyez le brick" at 2119. (Boender-Netherlands)
- 2618.5 GYA-UK Royal Navy, Northwood, FAX weather charts at 2116. (Boender-Netherlands)
- 2680.0 4XZ-Israeli Navy, Haifa, CW marker at 2104. (Boender-Netherlands)
- 3167.0 Hotel Foxtrot-US Navy, working Mike, Delta, and Sierra in Link-11/16 coordination net, at 0033. (Cleary-SC) Foxtrot-US Navy, working various single-letter stations at 0607. (Tom Severt-KS)
- 3450.0 OK-Pirate CW hobby beacon, possibly Oklahoma, at 0549. (Severt-KS)
- 4096.0 "S"-Pirate CW single-letter hobby beacon, Mojave Desert, CA, at 0150. (Severt-KS)

- 4096.25 Unid-Pirate CW hobby beacon, probably CA desert, keyed 1.1 seconds on, 1.1 off, loud at 0440, weak at 2229. (Hugh Stegman-CA)
- 4149.0 WBN3013-Crowley Marine seagoing tug *Sentry*, position report to WPE, Jacksonville, FL, at 0507. (Cleary-SC)
- 4280.0 PBB-Dutch Navy, Den Helder, RTTY channel status marker at 0636. (Boender-Netherlands)
- 4322.0 MGJ-UK Royal Navy, RTTY channel status at 0639. (Boender-Netherlands)
- 4366.0 Unid-Informal, typically unauthorized, fishing vessel ragchew at 0301. (Severt-KS)
- 4372.0 "W-4-A"-US Navy, calling "T-O-G" and Franchise, at 0142. (Cleary-SC)
- 4438.0 WRCCBUFFALO-National Grid USA Service Company, NY, LSB ALE sounding, also on 3155 and 7300, at 0140. (Ron Perron-MD)
- 4490.0 USDAHQ1-US Department of Agriculture Headquarters, DC, passing text to USDAEOC2 (USDA Alternate Emergency Operations Center, MD), and USDAERF1 (possible USDA Emergency Relocation Facility, WV) ALE from 1655 to 1708. (Jack Metcalfe-KY)
- 4583.0 DDK2-German Weather Office, RTTY weather codes at 0643. (Boender-Netherlands)
- 4603.0 FC4-WGY904, FEMA Region 4, Thomasville, GA, calling TN4 (WGY924, Nashville, TN), ALE at 1143. (Cleary-SC)
- 5320.0 Beluga-USCG Cutter *Beluga*, calling CAMSLANT at 0135. (Cleary-SC)
- 5378.0 FC4 (FEMA Region 4) calling SC4 (WGY934, Columbia, SC), ALE at 1250. (Cleary-SC)
- 5696.0 "J-2-W"-Probable USCG using a tactical trigraph, securing radio guard with CAMSLANT Chesapeake, VA, at 0150. (Severt-KS)
- 5708.0 572599-US Air Force Reserve KC-135R tanker, calling JNR (Puerto Rico), ALE at 2056. (Cleary-SC)
- 5711.0 USDAEOC2-US Department of Agriculture, Alternate Emergency Ops Center, ALE sounding at 2048. (Perron-MD)
- 5717.0 Halifax Military-Canadian Forces, NS, working Rescue 313, a CC-130, with message relay for Rescue Coordination Centre Halifax, at 0312. (Cleary-SC)
- 5732.0 39C-DEA, reporting a target to Panther (DEA, Bahamas), at 0458. (Cleary-SC)
- 5900.0 Cuban "Cut Number" station (M08a), CW callup "----- UNTDA TGUUD" (----- 42031 08483), into message at 0512. (Bill Seamans-LA)
- 6428.0 ABC-Israeli intelligence test group (E10), two different days in AM, at 2028. (Boender-Netherlands)
- 6496.5 CFH-Canadian Coast Guard, Halifax, weather in RTTY, then into a FAX weather chart at 0800. (Severt-KS)
- 6524.0 Unknown "Cherta" numbers (S11a), callup 214/00, at 0900. (Mike L-West Sussex, UK)
- 6761.0 DeeCee 42-US Air Force Reserve KC-135R tanker, calling Peach 24 (E-8 JSTARS), at 2320. (Cleary-SC)
- 6806.0 AVS-US Civil Air Patrol National Headquarters, calling 037RM-RCAP (Rocky Mountain Region station), also on 8012, ALE at 1816. (Cleary-SC)
- 6809.0 FC4-FEMA Region 4, calling AL4 (WGY954, Montgomery, AL), ALE at 1234. (Cleary-SC)
- 6855.0 Cuban AM Spanish numbers (V02a), seven straight days at 2102. (Robert Jackson-OH)
- 6911.5 R00257-US Army CH-47D Chinook, calling R23614 (UH-60A Blackhawk), ALE at 1255. (Cleary-SC)
- 6980.0 Unid-Unauthorized fishing vessels, two guys with southern US accents, discussing their trawl nets at 0838. (Severt-KS)
- 6985.0 T12-US Army 12th Aviation, calling R26259 (UH-60A), ALE at 1102. (Cleary-SC)
- 7377.0 Unknown "Cherta" numbers (S11a), callup 214/00, at 1030. (Mike L-UK)
- 7477.0 SEMOHQ-New York State Emergency Management, Albany, ALE sounding at 1734. (Perron-MD)
- 7527.0 J38-USCG HH-60J Jayhawk helicopter, calling IKL (USCG Cutter *Tampa*), ALE at 1538. (Cleary-SC)
- 7697.1 Atchgoport190-AT&T, Chicago, IL, calling Atthighport204, ALE at 1202. (Perron-MD)

- 7990.0 ADWSCR-US Air Force, Andrews AFB, MD, ALE sounding, also on 10800, at 0642. (Perron-MD) *[Possibly a new US military net, per Larry Van Horn. -Hugh]*
- 8023.0 OH5-FEMA, probably Ohio, calling WGY 9030, ALE at 0502. (Perron-MD)
- 8050.0 HAF-US Army, Ft. Bragg, NC, calling DKB, NC, at 1900. (Perron-MD)
- 8125.0 POLO-Mexican military, calling DERBI in ALE, at 0245 and 0339. (Perron-MD)
- 8156.0 Coral Harbour Base-Royal Bahamas Defence Force, working C6WH, at 1347. (Cleary-SC)
- 8182.0 XSS-UK DHFCS, ALE sounding, also 7535, 8107, 9019, 10575, 12330, 12057.5, and 14508.5, at 0045. (Perron-MD)
- 8280.0 T8R1-Venezuelan Navy/ Coast Guard/ Riverine Forces, calling 3K5I, also 8298, LSB ALE at 0526. (Perron-MD)
- 8294.0 WDB 4655-Vessel Westward, calling vessel Harvey Guinness on "Channel 8A," at 1208. (Perron-MD) WBN3015-Seagoing tug Adventurer, calling WPE Jacksonville, no joy at 1710. (Cleary-SC)
- 8298.0 PNPP5-Venezuelan Rivereine Forces, calling BRIFFR15 (River Base Franz Risquez Iribarren), also on 8275, LSB ALE at 0115. (Perron-MD)
- 8416.5 NMO-USCG, Honolulu, HI, Maritime Safety Information in SITOR-B, at 0152. (Sevart-KS)
- 8417.0 IAR-Roma Radio, Italy, CW identifier in SITOR-A marker, at 2019. (Boender-Netherlands)
- 8418.0 XSV-Tianjin Radio, China, CW in SITOR-A at 2019. (Boender-Netherlands)
- 8424.0 SVO-Olympia Radio, Greece, CW in SITOR-A at 2021. (Boender-Netherlands)
- 8426.0 UIW-Kaliningrad Radio, Russia, SITOR-A traffic to an unknown vessel at 2046. (Boender-Netherlands)
- 8427.5 A9M-Bahrain Radio, CW in SITOR-A at 2022. (Boender-Netherlands)
- 8431.0 TAH-Istanbul Radio, Turkey, CW in SITOR-A at 2051. (Boender-Netherlands)
- 8431.5 UAT-Moscow Radio, Russia, CW in SITOR-A at 2051. (Boender-Netherlands)
- 8434.0 TAH-Istanbul Radio, Turkey, CW in SITOR-A at 2051. (Boender-Netherlands)
- 8552.0 CTP-Portuguese Navy, RTTY marker at 2039. (Boender-Netherlands)
- 8971.0 Fiddle-US Navy, Jacksonville, FL, clear and secure with Red Talon 71 (a P-3C), at 1706. (Cleary-SC)
- 8992.0 Reach 5988-US Air Force Air Mobility Command HC-130P transport, patch via Andrews HF-GCS to Lajes Meteo, Azores, at 2215. (Cleary-SC)
- 9001.6 "Z-6-F"-USCG using a tactical trigraph, clear and secure with "B-4-Q," at 0342. (Cleary-SC)
- 9007.0 Chalice Foxtrot-US Air Force E-3 AWACS, patch via Trenton Military to Seymour Johnson Meteo, at 2323. (Cleary-SC)
- 9350.0 T5L1-Venezuelan Navy, calling 6GY2, ALE at 0232
- 9576.0 Unid-Unknown numbers agency with English callup "284 Oblique 00" (E11), no message, at 0915. (Mike L-UK)
- 9610.0 E11, callup "312 Oblique 00," no message, at 1030. (Mike L-UK)
- 10588.0 MW3FEM-FEMA Region 3, ALE sounding, also on 2658, at 1742. (Perron-MD)
- 10800.0 ADWSCR-US Air Force, Andrews AFB, MD, calling CRSCRDAT (Unknown), also on 12090 and 14550, ALE at 2241. (Perron-MD)
- 10871.7 "D"-Russian Navy, Odessa, CW cluster beacon (MX), at 1900. (Mike L-UK)
- 10872.0 "C"-Russian Navy, Moscow, CW cluster beacon (MX), loud at 1859. (Mike L-UK)
- 10914.5 GWPWF33-Brazilian Navy Radio Station, Forteleza, calling GWPWBL (Sailing Training Vessel Brasil), ALE, also on 13101 and 14780, at 0045. (Perron-MD)
- 11175.0 Policeman-US military, continuous exercise EAMs and "standing by for traffic," changed callsign with zulu day change, heavy circuit noise rising between characters, at 0000. (Stegman-CA)
- AX 090-US Navy C-130T, patch via Puerto Rico HF-GCS to Naval Air Station Fort Worth, at 1438. (Cleary-SC) Yokota-US Air Force HF-GCS, Japan, 6-character exercise EAM "for Hotel force," at 1416. Andrews, very long 278-character EAM with the special repetitive formatting, at 1721. Unknown weak HF-GCS, 200-character special-format EAM, probably the recurring Saturday activity, at 1758. Andrews, 6-character EAM at 1813. (Jeff Haverlah-TX) Andrews-US Air Force HF-GCS, reading a very long 270-character EAM, at 1800. (Sevart-KS)
- 11226.0 Reach 5139-US Air Force C-17A, patch via unknown HF-GCS, at 0129. (Cleary-SC)
- 11232.0 Chalice Golf-US Air Force E-3 AWACS, patch via Trenton Military to Raymond 24 (Tinker AFB), at 1647. (Cleary-SC)
- 11486.0 Unid-Unknown numbers agency with English callup "383 Oblique 35," should have gone into a message but didn't (E11), at 0715. (Mike L-UK)
- 11487.0 Lincolnshire Poacher-UK intelligence, very weak message in progress at 1533. (Mike L-UK) *[Rare freq; last logged in 2004, before that 1998, and always in summer. -Hugh]*
- 11494.0 93A-DEA, position report to Panther (DEA, Bahamas) at 1648. (Cleary-SC)
- 12164.0 003CDCH09-US Centers for Disease Control, ALE sounding at 1958
- 12191.0 SCLC512-Venezuelan 512th Jungle Infantry, calling CLC51 (51st Jungle Infantry), ALE at 2323. (Perron-MD)
- 12353.0 WVN 6510-Unknown vessel on simplex channel 12A, traffic for unid coastal station at 2038. (Perron-MD)
- 12594.5 A9M-Bahrain Radio, CW in SITOR-A at 1925. (Boender-Netherlands)
- 12629.0 TAH-Istanbul Radio, Turkey, CW in SITOR-A at 1930. (Boender-Netherlands)
- 12631.0 KSM-Maritime Radio Historical Society, Pt. Reyes, CA, testing in SITOR-B with union news at 2135. KSM, switching to RTTY (45/170), same text, at 2147. (Stegman-CA)
- 12654.0 TAH-Istanbul Radio, Turkey, CW in SITOR-A at 1928. (Boender-Netherlands)
- 12756.5 A9M-Bahrain Radio, CW in SITOR-A at 1938. (Boender-Netherlands)
- 12821.5 CTP-Portuguese Navy, RTTY marker at 1942. (Boender-Netherlands)
- 13500.0 2Y13-Venezuelan Navy, calling 1EW1, ALE at 2105. (Perron-MD)
- 13527.8 "P"-Russian Navy, Kaliningrad, CW cluster beacon (MX), at 1019. (Boender-Netherlands)
- 13528.0 "C"-Russian Navy, Moscow, CW cluster beacon (MX), also 16332.0, at 1019. (Boender-Netherlands)
- 13528.2 "F"-Russian Navy, Vladivostok, CW cluster beacon (MX), also 16332.2, at 1628. (Boender-Netherlands)
- 13528.4 "M"-Russian Navy, Magadan, CW cluster beacon (MX), also 16332.4, at 1628. (Boender-Netherlands)
- 13927.0 Hoist 99-US Air Force KC-10A tanker, patches via US Air Force MARS to Edwards AFB, CA, at 1050 and 1130. Doom 92-US Air Force B-52H, MARS patch to Barksdale Ops, LA to report stuck landing gear, at 1558. Doom 92, patch to Barksdale "Red Ops" via MARS station AFA3AD, WI, at 1649. Rogue 09-US Air Force B-52H, MARS patch to Barksdale Ops to report missed refueling due to malfunction, at 1706. Gitmo 500-US Navy UC-12B, patch via AFA1EN, IN, inbound to homeplate at Guantanamo Bay, Cuba, at 1750. (Allan Stern-FL) Reach 4075-US Air Force Air Mobility Command, sent to 11407 by AFA1WP, came back to 13927 after no joy there, at 1824. Peach 33-US Air Force, patch to Robins AFB Meteo, GA, at 2137. (Sevart-KS)
- 16332.3 "K"-Russian Navy, Petropavlovsk-Kamchatskiy, CW cluster beacon (MX), at 1628. (Boender-Netherlands)
- 17436.0 Cuban Spanish AM numbers (V02A), callup 73231 73308 45501, then repeat of 1600 message, at 1700. (Sevart-KS)
- 17478.0 Cuban Spanish AM numbers (V02A), callup 30467 80500 12802 and message, at 1600. (Sevart-KS)
- 17480.0 Cuban AM Spanish numbers (V02a), seven straight days at 1602. (Jackson-OH) *[Probably on 17478. -Hugh]*
- 18264.0 KEY798-Unknown US Centers for Disease Control station, ALE sounding, also 8023 and 20659, at 1044. (Perron-MD)
- 25910.0 WBAP-Undelayed program audio of WBAP News/Talk 820, Ft. Worth, TX, ABC and local news in narrowband FM, at 1400. (William Hassig-IL) *[Right frequency; please correct last month's log. -Hugh]*
- 25950.0 KOA-Undelayed program audio of KOA Newsradio 850, Denver, CO, fading in narrowband FM, at 1000. KOA audio again, better skip than before, at 1400. (Hassig-IL)
- 25990.0 KSCS-Program audio of 96.3 KSCS, Ft. Worth, TX, with tinny narrowband FM audio and a subaudible tone, poor reception of "American Country Countdown," at 1400. (Hassig-IL)
- 27035.0 Unid-Live broadcast of a Catholic Mass, probably from Ireland, in FM at 1930. (Patrice Privat-France) *[Many unlicensed Irish churches broadcast services on Citizen's Band channels, per Ary Boender. -Hugh]*

High Speed Digital Communications

This month we take a look at one of the most common high-speed modems on the air, those operating on the MIL-STD-188-110A serial tone standard. We'll also give you plenty of frequencies for you to try. First, let's take a look at the options available to you for decoding these digital signals.

❖ 110A Decoders

The power and processing capacity of today's desktop and laptop computers and their soundcards have now brought the world of high-speed HF modems within reach of the masses. All of the following require a reasonably fast and modern Windows-based PC and simply take a line-level audio feed from your radio to the input of the PC's soundcard or decoder card input to produce text on the screen.

RFSM2400

This free and very capable modem was featured in detail in the April 2007 issue of this column. It has been updated with a few bug fixes since that time and still represents the cheapest way to tackle this interesting mode. The software can be used to both receive and transmit data. RFSM2400 is currently free.

SkySweeper

This software suite from SkySweeper Technologies also allows for decoding of the 110A signal, but only in the higher-end Standard Plus and Pro packages. The two versions will set you back approximately \$250 and \$500 respectively. Like RFSM2400, SkySweeper also allows transmit operation.

Hoka Code 300-32*

Hoka was probably the first to offer the 110A mode as part of its software. The Code 300-32 handily allows the listener to open two monitoring windows – one watching the 110A, the other for associated ALE – and decodes them simultaneously. 110A was also supported on some of the later builds of the venerable Code 30 ISA-bus based decoder. The Code 300-32 currently costs approximately \$6,200.

Wavecom W51 & W61*

The Swiss-based decoder company has also offered 110A for quite some time now. The latest W51 and W61 model decoder software/cards will lighten your wallet to the tune of about \$7,800.

At the time of writing, I'm not aware of any Linux or Mac OS X solutions for decoding these 110A modems, but there is no reason why these operating systems couldn't perform the task, given some programming. Please let me know if you know otherwise.

❖ 110A Basics

The 110A modem is most commonly heard in what is called the serial tone waveform, upon which we will concentrate our discussion. That being said, most of the software noted above will also decode the other less common 39- and 16-tone parallel tone versions. Both are quite recognizable to the untrained ear (see Resources for audio clips).

We've covered 110A high-speed modem operation and particulars in some detail in previous columns of *Digital Digest*, so here's a quick summary guide for anyone intending to listen in:

- 110A signals are burst communications and transmissions are usually quite short, typically lasting a few seconds, certainly not much more than a minute at a time.
- A 110A serial tone modem sounds like a 3kHz band of rushing white noise (see Resources for audio clips of the distinctive sound).
- The standard offers a number of different speeds, from 75bd to 2400bd with long and short interleavers. Most decoders sense these settings automatically and set the decoder accordingly.
- Most transmissions are sent on a whole kilohertz point, rarely 0.5kHz or any other offset.
- Tune the radio in USB mode with a 3 or 4kHz wide filter
- ALE will often precede a burst of 110A, so be on the lookout for MIL-188-141A or Tadiran ALE (see Resources for audio clips to get you accustomed to listening to the different types).
- Most transmissions are encrypted, but a number of organizations use modems with a particular lead-in or trailing sequence (see below).

You will need to be sure that your radio is on-frequency too, and to within a few 10s of Hertz. Anything more than +/- 100Hz off-tune and the decoder is likely not to synchronize and will not print traffic. You can always calibrate your receiver against a known frequency standard like WWV to be sure.

❖ Frequencies

So now you're all clued-up. Where to tune and what to hear?

US Coast Guard

The USCG HF network is completely encrypted with most transmissions using a 1200bd burst with short interleaving. The lead-in sequence, when viewed in ASCII coding is "UUUUUUUU..." which is just the decoder's way of showing you a series of reversals (binary 10101010) to synchronize the encryption units.

Frequencies:
5105, 5107, 5220, 5419.5, 5421, 6476, 6961,

6998, 7710, 7843, 7909, 8308, 8310, 9166, 9201, 9288, 10337, 10378, 10788, 11021, 13410, 13481, 14918, 14920, 18280 kHz USB

Venezuelan Navy

Relatively little traffic in the clear has been reported on these large networks. Traffic is mainly encrypted after a "TEQTEQTEQ..." lead-in sequence.

Frequencies:

5334L, 5439L, 6248L, 6357L, 6810L, 6810U, 6888L, 6890U, 6894L, 6895U, 7849U, 8260L, 8273L, 8285L, 8297L, 8340L, 8358L, 8810L, 8825L, 8500U, 8582L, 9017L, 9075L, 9190U, 9350L, 9355L, 9380L, 9400L, 10272U, 10600U, 10650L, 12220L, 12480L, 12537U, 12583L, 12546L, 13500U, 14790L, 16716L, 17080L, 19098L, 19200U, 20400L (LSB or USB audio) kHz

Venezuelan Army and National Guard

These networks use the same style of traffic as the Navy nets.

Frequencies:

5406, 6847, 6870, 8060, 9052, 12919, 13455, 14569kHz USB

Czech Diplomatic Service

Traffic is mainly composed of email, files and other office communications. It looks encrypted but often isn't; it's just a binary stream. You can quite easily see artifacts like email addresses, destination and origination and other server information. Their traffic starts with a lead-in of, "BCDEFGHIJKLMNOPQRSTUVWXYZ[]^_`abcdef..."

Frequencies:

18270, 19325, 20624, 20909, 20924, 23745 and 23755kHz USB

Spanish Navy

This net often transmits in the clear and uses call signs like ARMADA12 etc. No lead-in is used.

Frequencies:

12226, 13089, 16408, 17266, 17290kHz USB

Mexican Navy

This is another very extensive network of 110A connected equipment using Tadiran radios. If you are listening in the US and hear a Tadiran Autocall (their name for ALE), stay on frequency for a while and in many cases you'll be rewarded with a burst of 110A traffic. Much of this is in the

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Pulse Over-The-Horizon Radar Interference

This continues to plague the high frequencies, says Des Walsh, Ireland, in World DX Club *Contact*. It is not from the Australian JORN system but said to be from Hainan Island, South China. Now it comes across in three broad bands on HF: circa 7.3 to 9 MHz, 12.5 to 15.5 MHz and 19 to over 24 MHz (26 at times). In daytime it is particularly strong around 7.5, 14.4 and 23 MHz. He has tried to contact the International Amateur Radio Union concerning the interference to the amateur bands, but had not received any response after a few weeks. The Region 3 (Americas) section of IARU acknowledges the level of

interference and wishes something could be done about it.

The interference can be heard as a slow pulse, 5 or 6 per second, with a swishing chuff-chuff-chuff sound, not a sharp pulse, probably softened by multihop and multipath propagation. It can be heard above 13 MHz at night, too, when such frequencies are "dead," and best reception is on a vertical antenna (low angle DX). But Des is really amazed that so few people have heard it or have commented on it. It is really horrible interference to weak-signal reception.

BANGLADESH Message from Mahesh Chandra Roy, Senior Engineer, Research & Receiving Centre, Bangladesh Betar with new frequency 7250 for external service between 1230 and 2000, including English 1230-1300, 1745-1815 (V. of Islam), and 1815-1900. After 1630 also on 9550; reports wanted. Home service on 4750 (via Swapan Chakroborty, India; Patrick Robic, Austria, *DX LISTENING DIGEST*) Good news that listeners' requests have been heard and they at last abandoned the hopeless 7185. However, 7250 doesn't look too promising here in Europe: Vatican Radio uses it the whole evening; Family R. in Chinese via Taiwan 1100-1605 on 7249.97. 9550 should be free after 1700 when China and Vietnam close down (Mauno Ritola, Finland, *bangladdx* via Chakroborty, *DXLD*) 9550 at 1523: severe co-channel QRM from CRI-Nepali. Seems like bad frequency choice (Alokesh Gupta, New Delhi, *ibid.*) 1230 on 7250 was audible but too weak (Swapan Chakroborty, nearby Kolkata, India, *DXLD*)

BELARUS [non] Radio Racja (Poland) expanded its transmission times and now uses three SW frequencies: 6225 (Sitkunai, Lithuania) at 1530-1730, 6105 (Warsaw, Poland) at 1930-2200, 6120 (Warsaw) at 2200-2230, all 100 kW (Bernd Trutenau, Lithuania, *DXLD*)

BENIN E-mail from Mr. Eric Biokou, chief engineer of Radio Parakou, says station uses an RIZ transmitter manufactured in (what used to be) Yugoslavia, installed in 1995. Can be heard most evenings in Sweden on 5025, rated at 10 kW. Also has two 1970's transmitters which are broken and cannot be repaired as spare parts are not available (Christer Brunström, Sweden, *DXLD*)

BHUTAN On 6035.06, Bhutan Broadcasting Service, Thimpu, *2358-0040 fade out, several dates but not every day in late July, early August. Dzongha announcement, carrier sign-on 2358, horn fanfares, choir of Buddhist monks intoning. Stable signal level until 10 minutes before total fade out. According to my calculations, fade out began 60 minutes after sunrise at the point where the radiosignal first penetrated the E-layer on its way towards Denmark. QRM Colombia 6035 which increased in strength (Anker Petersen, Denmark, *DSWCI DX Window*) 6035 audible in English under strong Chinese signal, ID 1418 (Craig Seager, NSW, *Australian DX News*) Would it be too much to ask for the Chinese to let their Bhutanese neighbors have ONE SW frequency for themselves? (gh)

BBS Corporation inaugurated new 100 kW Thomson TSW 2100D DRM [capable] SW transmitter on 10 August. Inaugural ceremony was attended by the Indian Ambassador to Bhutan, Sudhir Vyas. It was installed with financial support from the Indian Government, in Sangay-gang, 2660 meters above sea level. They are having occasional DRM tests with power output of only 25 watts (via Alokesh Gupta, Mukesh Kumar, *DXLD*) Lyonpo Leki Dorji said the new transmitter will ensure that the illiterate population of the country who live in remote villages have better access to information about happenings in the country and to entertainment programs. Government of India financed the project at a cost of about Nu. 80.326 million. BBSC can be received in all the dzongkhags (*Kuensel* online via Gupta, *DXLD*)

BOLIVIA R. Universitaria, Cobiija, Pando, 4732.03 from 0058 Spanish talks, pop songs, 0207 tentative ID at close, SINPO 21221. Heavy RTTY QRM most of the time, but one night with longer breaks than usual and then up to 25332. Consistent RTTY QRM on 4732 which has been reported as being from a military, Crimond transmitter located on NW coast of Scotland. RTTY pattern seemed on for about 2 minutes, then off for a minute (Anker Petersen,

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; sesqui = one and a half; B-07=full/winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

Denmark, *DSWCI DX Window*) Some nights as late as 0255, peaking 0210-0230 (Bruce W. Churchill, CA, via *BC-DX*) Missing in early August, only RTTY at 0100, and not heard at 1000-1100 either (Robert Wilkner, FL, *Japan Premium*)

Strange message from a R. Universitaria announcer says the team, "Chicos de la Camarilla de Estudio 97" is *sui generis* (completely unique), and everyone uses a pseudonym from cartoon characters or science fiction, such as: *Genio Dexter*, director; *Pedro Picapiedra*, announcer and technician; *Harry Potter*, reporter, producer and announcer; *Mafalda*, announcer; *Pájaro Loco*, announcer; and *Charlie Brown*, announcer and creative producer, real name E. David Esquivel Zambrana, who wrote this. Their programming mixes scientific information, animation, humor, music, and they are gratified to be heard abroad (via Nicolás Eramo, Argentina, *DXLD*)

BRAZIL Since April, R. Baré, Manáus, 4895 has been renamed Rádio Globo Manáus. No longer transmits "God Is Love" church programming; has local origination in morning 1000-1600, but only on MW, with SW schedule 2000-0400. Contact: Kátia Cilene, adm@radiobare.com.br and manhadaglobo@radiobare.com.br (Paulo Roberto e Souza, Amazonas via Célio Romais, *Panorama*, @tvidade DX)

Rádio Inconfidência, (tentative) with mentions of Belo Horizonte, at 1002 on 6010, but also at 1017 on unlisted // 6073. R. Senado at 1047 on 6370, some kind of image from 5990 (Robertas Pogorelis, visiting Bahia, Brazil, *DXLD*) Leapfrog 5990 over 6180 Brasília halfway between; 6073 must be a spur (gh)

CANADA [and non] From mid-July to mid-August, CHU was once again clear of WHRI blockage on 7335 when checked at 0600, except on Sat & Sun when WHRI started at 0558; it was still on 7335 after 0900, although the posted schedule continued to show daily at 0600-1100. WHRI tentatively plans to use 7335 in the B-07 season at 0100-0600 instead (gh)

An issue was raised by Radio Canada International about time-signal station CHU on 7335, which has had some recent interference issues with broadcasting stations. HFCC Steering Board believed that this requirement should not be included in the HFCC database, but information about the transmission will be provided to HFCC members outside the database. Such fixed service transmissions can continue to operate in the 7300-7350 range as long as they don't interfere with broadcast stations (*NASB Newsletter*)

CHAD 7260, RD Nationale Tchadienne (?), N'Djaména, 1402-1650, vernacular, talks, tribal songs; blocked by Chinese music jammer at 1700; 45433 but huge distortion so no actual ID!; also observed at 2110 when strong (Carlos Gonçalves, Portugal, *DXLD*)

This could explain why I have not been hearing it around 0530 on 7290v. On 7260 at that hour, would bother Algeria via UK. Then heard the extremely distorted, extremely off-frequency 6165 transmitter of RNT on about 7262v, same characteristics as previously when identified on 7310v, 7290v, warbling variable beat against a weak signal on 7260, Algeria via UK. Must be a big problem back in the NAF target area, but does anyone care? (gh)

7259, RNT, N'Djaména, very distorted but strong with hi-life music & French DJ 2140. No sign of Vanuatu. Had national anthem 2227-2229*.

Also massive distorted signal 0613 in vernacular, possible after Algiers goes off at 0600 (Craig Seager, NSW, *Australian DX News*)

Centered on approx. 7257.16, audio chirping range from 7254.95 to 7258.39, using 2.3 kHz filter in E1 Radio set, 2100-2130 (Wolfgang Büschel, Germany, *DXLD*)

CUBA RHC's 11760 transmitter was putting

out numerous spurs, one day in July at 1212 past 1400. 11760 itself was somewhat distorted. Worst spur on 11794, and all the others found at plus or minus 34 kHz from 11760 and multiples of 34 kHz, as extremely distorted scratchy blobs, although weaker the further from 11760: 11624, 11658, 11692, 11726; 11794, 11828, 11862, 11896, 11930. These interfered with numerous stations, including R. Rebelde on 11655. Next day, no spurs audible, just 11760.

Checking for R. Nacional de la RASD for Western Sahara on 6300 at 0601, heard instead RHC English on weak mixing product of 6060 leapfrog over 6180, plus QRM from bubble jamming! Never noticed that before on this frequency; maybe from extremely strong 6030 transmitter blotting out R. Martí, somehow mixing into an RHC transmitter next to it. DentreCubans vs DentreCubans! (gh)

ERITREA V. of Broad Masses back on 7100, nothing on 7090. Horn of Africa music and talk, at 0410 (Eike Bierwirth, Germany, *WORLD OF RADIO*)

ETHIOPIA 9704.2, R. Ethiopia, Geja Dera, 1426-1437, English, western pops, chimes at 1430, newscast; adjacent QRM de Niger 9705 very strong (Carlos Gonçalves, Portugal, *WORLD OF RADIO*) 9704 is domestic service and apparent new time as WRTM 2007 has English at 1030-1100 M-F (gh) Also confirmed by Mauno Ritola, Radio Ethiopia's domestic service (5990/7110/9704.2) now with English at 1430. A friend in East Africa confirmed this replaces the 1030 English, no longer aired. 1430 is a better time for listeners in Europe; quite separate to external service (7165/9560), with English at 1600-1700 (Chris Greenway, England, *DXLD*)

7110.01, R. Ethiopia, Geja Dera, at 0320 Amharic news magazine format program, brief music bridges between segments, then traditional vocal at 0330. Good signal with slight hum from moderate \pm 50 Hz spikes. // 5990.006 (poor) and only an S1 carrier on 9704.17 (Brandon Jordan, TN, *DXLD*)

GABON Afropop music distraction, 17660 was missing for a few days as was its former target, Sawt al-Amal, clandestine for Libya, leaving Sa'udi Arabia's French service on 17660 in the clear from 1355. But then Afropop resumed, heard at 1503 causing heavy QRM to Sa'udi (Tomás Méndez, Spain, *logsderadio* yg)

GERMANY A short-circuit July 16 caused a fire damaging a transformer in the 6005 kHz Berlin-Britz transmitter which carried Deutschlandradio Kultur on 6005, putting it off the air. It remains to be seen if it is feasible to repair it or worth the cost (Kai Ludwig, Dragan Lekic, *DXLD*)

GREECE The Divine Liturgy and prayers can be heard weekly on the Voice of Greece, all in Ancient Greek, which is quite different than modern Greek. It's a bit tricky to hear in NAM, but well worth the effort: Sunday 0500-0715 on 9420, 11645, 15630 (Liz Cameron, MI, *Liz's Shortwave Obsession*)

INDIA The AIR Vividh Bharati program on 10330 is now broadcast from AIR Delhi (Khampur Site) with 250 kW, (ex via Bangalore 500 kW) at 0025-0435, 0900-1200, 1245-1740 (Jose Jacob, VU2JOS, *dx_india* yg) Bangalore azimuth for this was 335 degrees, also favorable for NAM (gh) That explains why we are no longer hearing 10330 at all (Raúl Saavedra, Costa Rica, *DXLD*) Nor here; I wonder what the azimuth is now? (gh) Vividh Bharathi used by All India Radio means "Indian variety." AIR Khampur is using "double dipole antenna" now on 10330 for optimum coverage of all India. I picked them up while in Germany and Austria recently (Jose Jacob, India, *DXLD*)

So there must be two lobes in opposite directions (gh) AIR is looking for reception reports for 10330, specially needed from upper northern & western parts of India from the states of Punjab, Himachal Pradesh, Uttar Pradesh, Uttaranchal, Maharashtra & Gujarat. Summary of reception/monitoring report in SINPO or SIO code may please be forwarded to All India Radio, Spectrum Management & Synergy Division at spectrum-manager@air.org.in (Alokesh Gupta, New Delhi, *dx_india* yg)

INDONESIA VOI, usually on only one frequency, heard on both 9525 and 11785 for Arabic at 1600, though some QRM on 11785 at 1630-1650 with NHK in French; also both OK for Spanish from 1700 (Tarek Zeidan, Egypt, *DXLD*)

IRAN "Voice of Justice" from our pals in the Islamic Republic of Iran on 9495 at 0130-0230: entire broadcast is crafted to propagandizing Americans, using, for the most part, American source material gained from various publications, including the *New York Times*. Link to their file of material read on the "Voice of Justice": <http://english.trib.ir/political/U.S.htm> (Curtis Sadowski, IL, *WTFDA Soundoff*)

ISRAEL As feared last month, Kol Israel did delete its external service hour in English, French, Spanish at 1900, replacing it from July 30 with more Russian from domestic network. English from REKA domestic continued for 15 minutes at 0330, 0930, 1730. This resulted from budget cuts and reduced studio time available to produce the programs. The only specific external service remaining was 1400-1600 in Persian. Staff were late being paid, and strikes were starting (*Jerusalem Post* and Doni Rosenzweig, *DXLD*) Standard time to resume Sept. 17, moving all remaining broadcasts one UT hour later (gh)

ITALY My source at Rai said SW to EEU was to stop August 1, and all SW would cease Dec 31 (Pedro Sedano, Spain, *Noticias DX*) However, monitoring showed most of these languages still heard after August 1 (Noel Green, Jean-Michel Aubier, Wolfgang Büschel, *DXLD*) Although in many cases only with music, not unusual during summer vacations, or due to illness, e.g. Swedish three times a week at 2000 on 6110 and 9780. My contact at RaiWay says the future of Rai shortwave is very bleak indeed. Over-

seas relays of Rai programming have already ceased and the shortwave services will close in near future, possibly September. It is sad to see yet another international radio station giving up direct shortwave broadcasting (Christer Brunström, Sweden, *WORLD OF RADIO*)

Glenn, according to my contact about broadcasts from Rai: "No good news. 6110 kHz [Ascension relay] is switched off, and all our SW transmission will definitely be switched off probably in September" (Roberto Landolpho, Brasil, *DXLD*) Just a few relays were via Ascension, such as 6110 and 11765 in our evenings, and one Italian broadcast via Singapore. Check for English to NAM at 0055-0115 on 11800, then French (gh) On Aug 7, English was music only; French had news (Steve Wood, MA, *WORLD OF RADIO*) Italian at 1400 on 17780, 1830 on 15380 were still on, mostly music (gh, OK)

KOREA NORTH [non] Echo of Hope on new 6003.0 at 1059-1140, alternating talk and music, 1100 bell and ID (Takeshi Sejimo, Japan, *BC-DX*) At 03-05 & 11-15, addition to jammed 6348 and 3985 at 03-05 & 11-19 (S. Aoki via S. Hasegawa, *NDXC*) 6003 audible here at 1251 as a het against Cuba 6000 (gh, OK)

9780, Furusato no Kaze (via Taiwan) *1600-1630*, interviews in Japanese, brief music (Edward Kusalik, Alberta, *DXLD*) The new abduction service

LAOS [non] Hmong Lao Radio disappeared from the WHRI schedule in August; had been Sat/Sun 13-14 on 11785. Also gone via Taiwan 15260 also 0100-0200 Wed & Fri? (gh) This program has been canceled for good. Thank you for your interest. Radio Staff (Hmong Lao Radio office in Minnesota, *DXLD*) But check their website <http://h-lr.com> for audio archives, discussion forums about Vang Pao, etc. Note the other Hmong programs on KWHR mentioned last month (gh), and:

Hmong World Christian Radio heard via WHRI, UT Fri 0330-0359 on 5835, see <http://www.hwcr.us> – not at 0300 as on WHRI webpage when there was a different Hmong broadcast (Patrick Robic, Austria, *DXLD*)

LIBERIA [non] Star Radio at 0700-0730 moved from 9525 Ascension to 13760 Rampisham, UK, where it is no longer audible here, just North Korea varying slightly off-frequency (Ron Howard, CA, *DXLD*) OK here with weak Korean QRM (Anker Petersen, Denmark, via Howard, *ibid.*)

LIBYA [and non] Sawt al-Amal, clandestine for Libya which had been at 1200-1400 and varied 17600-17700 trying to escape jamming, disappeared sometime in June or July, no longer heard, although the Afropop jammer usually on 17660 still showed up on occasion (José Miguel Romero, Spain, *DXLD*)

LITHUANIA The Mighty KBC, 6255, UT Sundays only to NAM at 0100-0200* heard with US pop music of the '80s, ad for KBC Imports, IDs, many station promos, English/German announcements, E-mail address and Holland address. Acknowledged listeners' reports. Very strong, really booming in (Brian Alexander, PA, *DXLD*) Also good here with mailbag in last few minutes (gh, OK)

MALDIVES ISLANDS [non] Minivan Radio, which left SW in March hoping for an FM license, did not get one, and with elections impending, resumed SW Aug 1, daily 1600-1700 on 11965 via Germany (*Media Network blog*) A one-month deal for August, planned to end August 31, but who knows? (Jeff White, RMI, broker for Minivan Radio, *DXLD*) Collides with CRI Kashi English to Europe, heavy QRM here (Wolfgang Büschel, Germany; José Miguel Romero, Spain, *DXLD*) Also that QRM is heard in Japan (Kouji Hashimoto, *Japan Premium*) But no QRM audible on recording made in Maldives, so will keep 11965 for time being (Jeff White, *ibid.*)

MÉXICO XEYU, Radio UNAM, continued its pattern of alternating activity and silence for a couple of weeks at a time in July and August. As of Aug 14 it was heard with a fairly good signal on 9599.2 after 1400; mostly classical music and cultural features (gh, OK) In México DF it was usually weak and noisy (Julían Santiago Díez de Bonilla, *DXLD*) 9599.25v, at 0550-0635+, 0135-0205+, 2100-2140+ with classical music & talk. Fair level but audio slightly distorted. Must use ECSS-LSB to avoid various stations on 9600; but in the clear at 0800-0845+ (Brian Alexander, PA, *DXLD*)

After three months of silence, XEXQ, 6045, San Luis Potosí was heard again July 29 at 1500, weak. Better the next day (Julían Santiago D. de B., DF, *DXLD*) Formerly was 24 hours, but unheard at 0530; carrier but no audio at 1240 and a few days later classical music before 1300. QRM at this hour is from VOR, Vladivostok in Chinese (gh, OK)

A group from the XIII Mexican DX Meeting visited XERTA, 4810 in early August. Miguel Ángel Rocha Gámez and Iván López Alegría filed separate reports about it. The 1-kW transmitter is running only 400 to 415 watts. They hope to increase to 30 kW and employ DRM to facilitate relays by other stations around the country, instead of expensive satellite feeds. Computer control uses freeware only. Manager is Sr. David R. Carrillo Blanco. For a QSL card, return postage is needed, and two reports in a one-month period; for five reports you get a sticker, and for ten, a diploma; after six months, a certificate as a monitor. To: Radio Transcontinental de América S.A. de C.V., López 157-4, Col. Centro, Deleg. Cuahutémoc, 06070 México DF. See <http://www.xertaradio.com/> (*DXLD*)

MICRONESIA PMA, 4755, which tested in Feb-Mar, still no sign at all of this, morning or evenings in mid-July (Craig Seager, NSW, *Australian DX News*) But website <http://radio.pmapacific.org> updated in August saying FM 88.1 was on air permanently from July and that SW would broadcast the same program; sked seems 19-13 UT. Maybe SW will soon be on too.

Logo is "The Cross" – maybe that name is used as ID (Jari Savolainen, Finland, DXLD) I doubt if they know what is going to hit them once they get on the air regularly. They really should work with someone to set up a QSL bureau. The plane from Hawaii arrives three times a week – they'll probably be getting their own mail sack! (David Norcross, HI, *ibid.*)

NETHERLANDS RN's announced plans to cancel *Radio-Enlace* from the end of October met with overwhelmingly negative response from listeners on the program's comments forum, but RN still planned to carry out its programming renovation. Until then, sked is: Fri 2331 17605; Sat 0141 9450, 6165; 0331 9590, 6165; Sun 0011 9450, 0211 9590, 6165, via Bonaire except 6165 Portugal (gh)

PAPUA NEW GUINEA Some stations were reactivated in July, perhaps due to elections. Vanimo 3205 heard well at 1130. Also good signal from Radio Central, 3290 (Chris Hambly, Victoria, DXLD) 3335, R. East Sepik, Wewak, listed as inactive in WRTH, but back on, Pidgin news 0824. Other PNG stations active 19 July: 3220, 3260, 3275, 3290, 3305, 3355, 3365, 3385, 3905. Inactive: 2410, 3235, 3245, 3315, 3325, 3345, 3375, 3395, 4890, 9675, 19/7 (Craig Seager, NSW, *Australian DX News*) 9675, NBC, Port Moresby, back later in July at *1930 (Chris Hambly, Vic., *ibid.*)

PARAGUAY 9734, R. Nacional SW inactive for two years due to damaged transmitter tube, replacement cost USD 10,000. Without that money there is no hope of return to SW (Dario Monferini and Roberto Pavanella visiting the station in Asunción, *playdx yg* via Horacio Nigro, Uruguay, BC-DX)

PERU From a visit to Iquitos: Saw a mural in a cyber café about Radio MIVIA (Ministerio Internacional Visión Amazónica), not only on 1310 but 3205 kHz [which has yet to be reported heard]. An employee said the radio was under rearrangement. Per a visit to R. Nueva Atlántida, 106.5, they are under new ownership and hoped to resume SW 4790 in July with 2 kW (Tetsuya Hirahara, *El Tiempo Hechicero DX News*)

Worst of all is not that stations are not being heard due to poor propagation, but that they are off the air, perhaps never to return, such as Radio Visión, Chiclayo, which used to reach here very well on 4790.2 (Manuel Méndez, Spain, *Noticias DX*)

SCOTLAND [non] From Aug 11, Scotland's only independent international broadcaster, R. Six International, returns to SW with its Saturday morning broadcast on 9290 to Europe, the Far East and Pacific, 0700-0800 on 9290, 100 kW via Latvia; to continue until end of Sept, and then be reviewed. See <http://www.radiosix.com> (Tony Currie, July 26, DXLD)

SERBIA [and non] In mid-July I again phoned Belgrade, technical department of International Radio Serbia. Spare parts for the Bijeljina transmitter, Bosnia had arrived in Belgrade airport awaiting customs. Because there are some legal problems between Serbia and Bosnia, this would be processed in about one or two months. When spare parts actually arrive in Bijeljina, very soon the broadcasts with 250 kW will start. Till then, the Stubline, Serbia, mobile transmitter with only 10 kW is operational (1300-2100 on 7240). My personal opinion is that it is very possible this will be delayed more. The situation is very complicated. Probably next year a new law will determine the future of International R. Serbia (Dragan Lekic, Serbia, DXLD)

SIERRA LEONE [non] Like Star Radio, LIBERIA at 0700, 13760 Rampisham is new frequency, ex 9525 Ascension for Cotton Tree News (CTN) at 0730-0800, from August 1, but inaudible here, only North Korea (Ron Howard, CA, DXLD) CTN with very good strength and audibility at 0745 on the new 13760 (Björn Fransson, Sweden, *ibid.*)

TAJIKISTAN Revised sked for V. of Tajik external service, only SW frequency 7245, included English 0900-1100 to CAs/SAs, 1730-1800 CAs/ME (WRTH July update) Yes, and English later extended to 1700-1800 (Jari Savolainen, Rumen Pankov, Dave Kenny, DXLD) and at 0900-1000, not -1100 (Mauno Ritola, Finland, *ibid.*)

TURKEY V of Turkey's fortnightly *DX Corner* on Saturdays + UT Sundays after 0300 confirmed on July 14-15, so if it stays in synch, on-weeks should be Sept 22, Oct 6, 20, etc. It ran from 25 to 35 minutes into the broadcasts, but consisted only of acknowledgments of reception reports. VOT program sked is not available on website but only in a twice-yearly folder by p-mail. It remains confusing with four different columns of English programs, labeled I and II, for terms III and IV, which mean the 3rd and 4th quarters of the year. *Live from Turkey* is shown as the only feature program on Thursdays, while in fact it's only on the 1230 broadcast as we confirmed by monitoring, with another edition on the 1830 Tuesday broadcasts. Major change for Oct-Dec is the final item on Monday + UT Tuesday broadcasts: *Mevlâna* (about Sufism) replaced by *Idil Biret* (concert pianist) (gh)

U S A IBB notified staff on July 24 that the Delano transmitting station north of Los Angeles would be closed down at the end of October (gh) Employees then will be RIFed as a result of the manufactured "lack of work." The plan would have the employees on the payroll only through January 5, 2008 (AFGE Local 1812) It's used now only for Radio Marti and for VOA Spanish, Creole, and Special English to Latin America (kimandrewelliott.com) And R. Thailand relays; perhaps the ones via Greenville will continue (gh) IBB officials say the Delano facility will remain in "cold storage standby status." As budget allows, "we will redistribute viable equipment to the

rest of the IBB network." (*Radio World* via Zacharias Liangas)

Oil & Gas magazine reported in 2001 that California's largest natural gas field may be lying under and by the City of Delano, according to officials of Tri-Valley Oil & Gas Co. Tri-Valley had leased 800 acres of federal land nearby including a square mile owned by Voice of America (via John Vodenik, Delano, DXLD)

David Baden of Radio Free Asia, badend@rfa.org has this request for broadcasters and shortwave listeners: We are trying to compile information about shortwave jamming. Could you please provide us with info on transmitter sites you suspect are being used specifically for jamming? Any information would be kept confidential, very beneficial and would be greatly appreciated (NASB Newsletter)

We have a series of new QSL cards for different programs, like *Radio Cuba Libre*, *Trova Libre*, *DXPL/Aventura DXista*, *World Cricket Today* and the *Radio Prague* relays, plus the EDXC Conference in Switzerland in November (Jeff White, WRMI, DXLD)

And Jeff has added one for our WORLD OF RADIO / MUNDO RADIAL. For this hard-copy-only QSL, do not report to gh, but direct to WRMI, P O Box 526852, Miami FL 33152, or info@wrmi.net It is available of course, only for WOR and MR as heard on WRMI 7385 or 9955 (gh)

As of mid-August, WRMI program schedule showed WRN relays M-F 1600-2300 on 9955, including RTE Ireland, not otherwise on SW, at 1800-1830 and 2100-2130. For full grid, click on the pink WRMI logo at the bottom of the schedules page at <http://www.wrmi.net>

New WBCQ programming: *Bluegrass State of Mind*, Fridays 2200-2300 on 7415. Full WBCQ schedule at <http://www.zappahead.net/wbcq> (Larry Will, MD, DXLD) Leads to <http://dannyhaller.com> for this show, where we find he is a blind 5-string banjo player (WORLD OF RADIO)

One Monday morning, after WOR concluded at 0445, WBCQ 7415 stayed on the air past 0900 repeating WORLD OF RADIO current and previous editions over and over in alternation (Will Martin, MO, DXLD)

Andrey Nekrasov, now based in Brooklyn NY, is manager of Beth Shalom Center Radio. He established Radio Center in Moscow in 1992 as the first Christian radio station in the former USSR. He had previously produced DX programs on R. Moscow. Now a Beth Shalom Center goal is a U.S. National Russian Radio Network on 26 MHz in DRM mode (Jeff White, NASB Newsletter)

During heavy sporadic E openings in July, 11 meter broadcast auxiliary studio relay logs on FM at various afternoon times: 25910, WBAP Fort Worth TX and 25990, KSCS Fort Worth TX; 25950, KOA Denver (Harold Frodge, MI, *MARE Tipsheet*)

George K. Otis, Sr., 90, founder of High Adventure Ministries and Voice of Hope, died July 22 (High Adventure) HAM operated a shortwave transmitter in southern Lebanon until destroyed by fire in 1997. KVOH SW transmitter in California sold to, or at least now operated by, la Voz de la Restauración. According to 2007 WRTH, High Adventure still owns SW transmitters on Palau, but these are not mentioned at the HAM website. All very mysterious (kimandrewelliott.com)

Successors of the ministry include Bible Voice UK, Bible Voice USA and High Adventure Canada, who brokered airtime [primarily in Germany] as well as T8BZ Palau, now with its own management and mostly relaying Radio Free Asia. But the primary successor is Voice of Jerusalem, broadcasting from Jerusalem via the Sky Angel satellite network in North America with conservative, Israel-loving Christians the target audience (*Medien aktuell: Kirche im Rundfunk* by Hansjörg Biener, via Kai Ludwig, DXLD)

VANUATU RNZI Technical Manager Adrian Sainsbury was in Vila and Santo and says that a joint NZAID, AUSAID and EU Aid program will deliver new SW transmitters to Vanuatu as it's been decided that a full SW service should be reintroduced as soon as possible. The existing SW aerial system is in good condition. The new head of VTBC in Vila is the ex-Radio Australia head, Jean-Gabriel Manguy. His job is to oversee the installation of all the new transmitters, studio upgrades, etc. (David Ricquish, NZ DX Times) 3945 already reported back on air last month

VENEZUELA [non] From press reports that *Aló Presidente* can go on for hours and hours all day Sundays, I wondered how long the RHC relay can stay with it. 11875 and 17750 heard August 5 until 1950* (gh)

RNV via Cuba heard August 12, 2007 at 2030 on 17705, still announcing its original transmission schedule from April 2004, now long outdated, not even including the three morning broadcasts added last year. Neither RNV nor RHC has ever published an up-to-date schedule. It was left to us, the DX Community to monitor the true schedule of RNV, and that has been published in this column. Since the Bolivarians obviously do not want it to get out, I am happy not to publish it again until any further changes be discovered (gh)

Another QSL from RNV came via Fedex including a photo ID of v/s César Mosco with a copy of his fingerprint on the letter! (Sam Barto, CT, NASWA Journal)

ZIMBABWE [non] R. V. of the People, via Madagascar 9765, at *0400-0455* mostly local language but heavily accented English from 0439, many IDs, African music. Very weak music loop jammer heard underneath at 0449-0455 (Brian Alexander, PA, DXLD) Other nights mostly in English (Dan Sheedy, CA, *ibid.*)

Until the Next, Best of DX and 73 de Glenn!

BROADCAST LOGS

NOTEWORTHY LOGS FROM OUR READERS

Gayle Van Horn, W4GVH

gaylevanhorn@monitoringtimes.com
http://mt-shortwave.blogspot.com

0010 UTC on 7555

KUWAIT: VOA relay. Pop music and language lesson on internet shopping and health care tips. Dynet.com URL for "study materials." Station sign-off at 0030. **Radio Kuwait** (tentative) 6055, 0149-0205 with continuous Arabic recitations under co-channel REE Spain. (Scott Barbour, Intervale, NH) **Radio Free Asia** via Kuwait (tentative) 9365, 0140-0145. Tibetan text of poor signal quality. SINPO 24222 // 11695 (UAE) weaker. (Jim Evans, Germantown, TN)

0019 UTC on 4939.82

VENEZUELA: Radio Amazonas. Spanish conversations preceded by *Godfather* theme music. Several tentative IDs at reduced audio levels and fair-poor signal quality. (Barbour) Weak signal audible 4939.66, 0105-0120; 0915-0933. (Brian Alexander, PA)

0024 UTC on 6925

PIRATE: WHJR. Station ID as "Hey Joe Radio" and "WHJR-All Joe all the time." Classic rock tune *Hey Joe* by Jimi Hendrix with poor signal quality. Pirate, **WMPR** 6925, 0053 with synthesized ID. (Joe Wood, Greenback, TN)

0210 UTC on 6536.06

PERU: Radiodifusora Huancabamba. Peruvian folk music to Spanish text and mentions of Huancabamba. Station sign-off 0224 with national anthem. (Alexander) Peruvians in Spanish: **Radio Tawantinsuyo** 6173.80, 1015; **Radio Cuzco** (tentative) 6193.31, 1025-1030. (Chuck Bolland, Clewiston, FL) **Radio Altura** 5014.4, 0325-0335; **Radio del Pacifico** 4974.8, 0335-0345. (Evans)

0228 UTC on 15385

PHILIPPINES: VOA relay. Poor signal (SINPO 24222) for Chinese text from announcers. Parallel 17765 slightly stronger. (Evans) **FEBC** via Bocaue, Philippines 9920, 1132-1156. Religious hymns to brief vernacular text. Poor signal with fading. (Barbour)

0300 UTC on 4780

DJIBOUTI: RTD/Radio Djibouti. Arabic. National anthem to sign-on routine and *Call to Prayers* at 0303. Fair signal to 0311. (Barbour) 0310 (Wood).

0331 UTC on 6055

SPAIN: REE. Spanish. Well done program of opera and classical music featuring Mozart selections. (Wood) 15345, 1730-1740 (Spanish) (Arnaldo Slaen, Buenos Aires, Argentina) 6055, 0000 SIO 444. (Bob Fraser, Belfast, ME) 11625, 2140-2150 (Wood).

0335 UTC on 4899.8

GUATEMALA: Radio Buenas Nuevas. Spanish text to lively local music. Good signal SINPO 44333. (Evans; Wood) **Radio Verdad** 4052.46, 0435-0440+ with religious hymns. (Frodge) **Radio Cultural Coatan** 4779.87, 1117-1135. Ranchera music to religious service. (John Wilkins, Wheat Ridge, CO).

0338 UTC on 6175

CANADA: Voice of Vietnam relay. Announcer team with topics of interest from news in Vietnam. SIO 433. (Stewart MacKenzie WDX6AA, Huntington Beach, CA) **Radio Canada Int'l** 9515 at 1515. (Fraser)

0350 UTC on 9515

RUSSIA: Voice of. Comments from *Our Homeland* program to Russian vocal music. SIO 433. (MacKenzie) 12040, 1520. Report on human rights concerns in China and the 2008 Olympics. (Fraser)

0422 UTC on 7275

TUNISIA: RTV Tunisienne. Armchair signal quality for Arabic programming. Comments between Arabic/French music vocals of Torch songs and traditional Middle Eastern style. (Wood)

0435 UTC on 4930

BOTSWANA: VOA relay. Fair-to poor signal for Voice of America programming to Africa. **VOA São Tomé** relay 4960, 0450-0455. Discussion on Iraq heard despite poor signal quality. Strong parallel on 9575 (Greenville) and weak on // 12080 (Morocco) (Evans).

0519 UTC on 9575

MOROCCO: Radio Medi Un. Arabic/French. Good signal for announcers presenting mix of Middle Eastern music to newscast at 0530. **Radio Farda** via Brieche, Morocco 9865, 0550-0555 news on Iraq in unknown language. (Wood)

0533 UTC on 9580

GABON: Afrique Numero Un. French news from announcer duo, including extended news on the United States, followed by financial

news report. Fair-good signal. 4777, 0514-0521. (Wood)

0740 UTC on 9524.96

INDONESIA: Voice of Indonesia via Cimanggis. Gamelan music used for interval signal for 20 minutes. Occasional English ID into programming at 0800. Interference from Clandestine-Cotton Tree News. Additional stations audible in Indonesian: **RRI-Gorontalo** (tentative) 3266.42, 1127-1215; **RRI-Manokwari** 3987.05, 1136-1230; **RRI-Fak Fak** 3789.98, 1143-1220; **RRI-Pontianak** 3976.06, 1151-1215; **RRI-Ternate** 3344.84, 1155-1221; **RRI-Palangkaraya** (tentative) 3325, 1205-1220; **Voice of Indonesia** 9524.96, *1300-1309. (Wilkins)

0806 UTC on 4835

AUSTRALIA: VL8A Alice Springs. Male/female announcers' discussion to phone chat interview. Two music breaks switched to // 2310 at 0830. Earlier // 4910 (**Tennant Creek**). Both 4MHz freqs heard but weakly. **VL8K Katherine** 2485, 1137-1205. Fair signal for old blues tunes on slide guitar. (Wilkins)

0945 UTC on 6135

BRAZIL: Radio Aparecida. Portuguese. Religious music program to "Radio Aparecida, Rede Católica de Rádios." SINPO 44343. **Radio Cultural** 6170, 0958-1003. ID "Radio Cultura São Paulo." **Radio Nacional do Amazonia** 6180, 2350-0000 with ID and lottery results. (Nicholas Eramo, Buenos Aires, Argentina)

1016 UTC on 11710

NORTH KOREA: Voice of Korea. First log of this station. Male's discussion on former Soviet Union to text on Dear Leader Kim Jong Il. Station ID amid poor signal. (Wood) 11710, 1525. SIO 252. (Fraser)

1031 UTC on 6009.48

COLOMBIA: La Voz de tu Conciencia. Spanish. Religious vocals and ranchera music to 1039. English/Spanish religious sermon to ID at 1057. Good signal with slight fading after 1100. (Wilkins)

1040 UTC on 9490

CLANDESTINE: Radio Free North Korea (via Taiwan). Very clear signal for announcer duo's Korean announcements. SINPO 24332. **Open Radio for North Korea** (ORTN) via KWHR 9930, 1110-1116 with jamming present. (Slaen) **Voice of the People** 3912, 1204-1211 (Korea) // 6600 with jamming on both frequencies. **Echo of Hope** 3985, 1219-1240 (Korean) // 6348; **Shiokaze** (via Taiwan) 9485, *1300-1220.* (Chinese). **Echo of Hope** 6003, 1220-1240 // 3985, 6348; **Furusato no Kaze** (tentative) 9779.97, 1602-1630.* (Wilkins) **Radio Nacional Saharaui** 6300, 2342-0000.*; **Radio Republica** 5910, 0322-0327. (Spanish) (Wood)

1235 UTC on 15240

SWEDEN: Radio Sweden. Program interview with Her Majesty Queen Silvia of Sweden. (Fraser) Additional monitoring 0230-0300, 6010 and 1330-1400, 15240, 15735. (Tom Banks, Dallas, TX)

1450 UTC on 11730

JAPAN: NHK/Radio Japan. Easy-listening sounds of nature music program to focus on Japanese artist. (Wood) 17870, 2109. *Japan Music Scene* program. (MacKenzie)

1530 UTC on 17770

SOUTH AFRICA: Channel Africa. News and commentaries on Africa. SIO 353. (Fraser). 9685, 0545 with text on scientific research in South Africa. (Wood)

2100 UTC on 9290

LATVIA: Radio Waves International relay. Special country music dedicated to France's *Rendezvous Festival* celebrating their 20th birthday. Several identifications between country tunes. SINPO 44444. (Slaen)

2313 UTC on 17785

AUSTRALIA: Radio Australia. *Contact Asia* program featuring crimes against humanity in Timor and Aussie troops serving in Iraq. Several station IDs for shortwave and local FM. (Wood) Subsequent monitoring: 12080, 0018; 13690, 2323; 15515, 0402; 15415, 0410; 5995, 1420. (MacKenzie) 15240, 0341-0346 (Wood).

Thanks to our contributors – Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times
English broadcast unless otherwise noted.

PROGRAMMING SPOTLIGHT

WHAT'S ON WHEN AND WHERE?

Fred Waterer

fredwaterer@monitoringtimes.com

www.doghousecharlie.com/radio

Romania, Myth and Magic

October means fall in the northern hemisphere. The days become shorter, a little bit colder, and harvest festivals begin to take place.

October in many countries is also the time for Hallowe'en, or All Hallow's Eve. Its origins lie in the Pagan tradition of the Celts, later co-opted by the Church. Today it's a rather benign evening, mostly for children (although recent statistics suggest that more money is spent on this holiday than any other except Christmas). It is a night of make believe. Especially make believe ghosts and monsters and vampires.

Which brings us to Romania. Thanks to Bram Stoker's novel "Dracula," and Bela Lugosi's performance in the film version, Romania, specifically the region of Transylvania, is forever associated with vampire bats and blood-sucking evil counts with an eye for the ladies.

Stoker placed his "Count Dracula" in Transylvania, but the real historical character was Vlad Dracul, prince of Wallachia. This 13th Century ruler is the subject of much debate. To some, he was a just ruler and patriot, standing for the rule of law and against Turkish encroachment on Europe. To others he was a cruel and sadistic tyrant, delighting in the suffering of others.

While much of this reputation is based on his opponent's propaganda, there is enough corroboration to suggest that there is some truth to both views. His idea of enforcing the law was to have criminals – any and all criminals – put to death in cruel and perverse ways, usually by impalement. (He is also known as Vlad the Impaler.) Stories abound of his cruelty, impaling thousands at a time, whether it was prisoners of war, or subjects of rebellious provinces or common criminals.



In Romania they find all the vampire hype confusing and ridiculous. "He is considered one of the greatest leaders and defenders of Romania and was voted one of '100 Greatest Romanians' in the *Mari Români* television series aired in 2006." (Wikipedia)

The Romanians themselves, largely because of geography, are the descendants of the Roman province of Dacia. Romanian is a Romance language, from the same family of languages as Italian, French and Spanish.

Until 1989, it was ruled by communist dictator Nicolae Ceaucescu and his wife, among others. Like Vlad the Impaler in a previous century, he ruled with an iron fist and was ruthless towards his opponents. As the regimes toppled across Eastern Europe in that year, Ceaucescu and his wife were among the few former leaders, who were so despised that they were executed.

❖ Radio Romania International

I first heard RRI when it was known as Radio Bucharest, the mouthpiece of the Ceaucescu regime. It was fairly typical of Eastern European broadcasters with a slight twist. Ceaucescu's government steered a relatively independent course from Moscow and the other Soviet bloc nations. For instance, Romania did not support the boycott of the 1984 Olympics. Still, it was a repressive regime. And the broad-

casts were plodding and fairly predictable like most Eastern European broadcasts at the time.

Fast forward to 1989. The dictator is dead, and an apparent popular uprising is in progress. I heard a fascinating broadcast from Radio Bucharest at the time. Someone, presumably an employee, was taking the listener through the building, stopping to interview whomever he encountered; sounds of much joy were heard at the downfall of the dictator. The radio building had been sacked. This person appealed for items that a radio station might need, such as office supplies and simple equipment. It was quite a broadcast.

Romania's new democracy had some growing pains. In 2006 it finally joined the European Union.

❖ RRI Today

Daily broadcasts begin with **Radio Newsreel**. This program has the same jingle as Kol Israel's news. News is followed by commentary on an issue of the day.

Pro Memoria (Mondays) - A look at some issue in Romanian history. Recurring theme is a repudiation of the communist past.

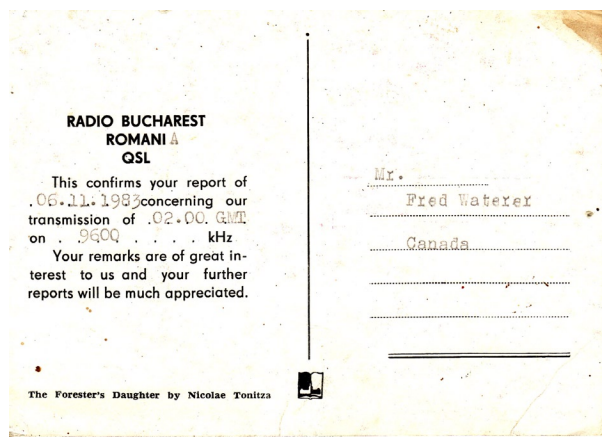
Business Club (Tuesdays) - Romania is open for business.

Letter from Bucharest (Wednesdays, Sundays)

- An essay by a very British sounding Tom Wilson. During the programs I listened to, he discussed the trials and tribulations of Yoga. Yoga was banned in the communist era (any activity that involved people gathering in groups was considered suspicious). Another letter described his adventures while driving in Romania. Driving in Romania is a "nightmare" and the used car market is "stupidly expensive." Tom has quite a sense of humor.

Cookery Show (Wednesdays, Sundays) - "Sour Cherry Parcels". Yum. Sounded kind of like a perogie. On another show, the female presenter gave the recipe for a meat and potato dish. As a quick glance at my waistline will confirm, I do all the cooking in my household, and not to brag, but I do quite well (see above). I know the RRI website is still under construction. But, I really do hope that they would post these and other recipes to the website at some future point. So please RRI, "flesh" out your website; make me want to come back.

Society Today (Wednesdays) - A program which





looks at Romanian society today. Immigration to Romania, Multicultural Bucharest and the Roma population are just some of the topics covered.

Travelers Guide (Thursdays) - Travelers Guide, as the name suggests, introduces the listener to a variety of tourism destinations within Romania. Besides historical and pleasant destinations, the program provides information on such things as travel costs, comparisons of methods of transport, hostels and accommodations and Romanian cuisine. The texts of a number of past programs are online, and covered such diverse areas as monasteries in different regions, travel in the Aegean region and Youth travel options.

A Challenge for the Future (Fridays)

Terra 21st Century (Last Friday of the Month) - Terra 21st Century is a monthly program.

Among the topics covered have been a discussion of a national park/protected area, home of a number of protected species of plants and animals; "Protected Areas as seen by the Experts"; and the Apuseni National Park. Discussion mostly of biodiversity and efforts to protect it.

Followed by **Sports Weekend**. Sports in Romania seems to be limited to soccer.

World of Culture (Saturdays)

The Week in Review (Saturdays) - A whirlwind review of events in Romania from the previous week. An episode in late July covered an extreme heatwave that hit the country. Also a tour by Julio Iglesias and of course...soccer.

Roots (Saturdays) - A look at stone carving in Romania.

RRI Encyclopaedia (Saturdays) - A recent episode looked at Romanian author Nicolae Steinhardt, a writer and political prisoner during the communist era. His works were discovered after 1989, sadly the year he died. He didn't live long enough to enjoy his fame, or hear his works read on the "Free Europe Radio." Other programs have looked at topics such as the Romanian National Film Archive, Period Costumes and other cultural topics.

Cookery Show (again, Saturday) - Those sour cherry things again. Mmmm.

Focus (Sundays) - Focus looks at a particular issue in depth. Recent programs have included a look at the life of an Orthodox Patriarch who had recently passed away, and a look at regional politics and tensions in the Black Sea region between Russia, the new EU countries (Romania, Bulgaria) and Turkey.

Inside Romania (Sundays) - A recent program looked at underwater delivery of babies in Romania. Surprisingly interesting.

Sport (Sundays) - What could they possibly talk about? Oh I don't know. Perhaps...soccer!

❖ RRI Themes

There are two main themes in RRI programming. The first is an emphasis on Romania as part of Europe and a modern 21st century nation (or on their way to being so). You find this expressed

continually in the news, and features.

Secondly, RRI repudiates the communist past so vehemently it verges on praising the fascist past, or at least excusing it. Some of this programming can be a bit disturbing, such as the rehabilitation (to a degree) of the wartime leader of the country, an ally of Hitler. Still, this aspect of history only pops up rarely.

❖ Hearing RRI

Shortwave broadcasts to North America:

UTC kHz	
0000-0100	9775, 11790
0300-0400	6150, 9645
2030-2100	11940, 15465
2200-2300	9790, 11940

Daily broadcasts are also available online at the RRI website www.rri.ro (not audible on demand) and at the World Radio Network www.wrn.org (daily half hour for Europe on demand)

❖ The War of the Worlds

In October 1938 Orson Welles and the Mercury Theatre of the Air perpetrated the greatest Hallowe'en prank in history.

Welles and company created a broadcast version of H.G. Wells' (no relation) 1898 novel *War of the Worlds*, setting it in New Jersey and New York. Although there was a disclaimer at the beginning of the program, many people failed to hear that. Many had been listening to Edgar Bergen and tuned into the broadcast "in progress." The broadcast took the form of breaking news bulletins, something that was relatively unheard of at the time. It recounted horrific tales of the Martian rampage.

While many accounts have been written about the panic which followed, most research suggests that the degree of alarm was not as great as generally thought. No doubt some people did overreact, but it could have been worse. An actor was to play Franklin Roosevelt during the play,



but CBS forced Welles to make him an unnamed Cabinet official, who sounded remarkably like FDR ☺.

The WKBW Version

"On Halloween 1968 or 1969 (sorry, the exact year is fuzzy) I was on the air... my first professional job...at WICE in Providence when the phones began to ring off the hook with people asking me what was going on in Buffalo.

"It was my first introduction to one of the two most extraordinary stations I ever worked for, and although I couldn't listen that night to the first *WOTW*, imagine my wonder and delight a couple of years later when, after only a couple of weeks at KB, I was drafted to participate in the remake (which I believe was actually 1970).

"Jeff Kaye was a classic and classy guy. He thought of radio as theatre of the mind...and he created a station that was very visual to listen to. I had never participated in any sort of radio drama, so it was a total learning experience for me...especially watching how the SFX of me being done in by the aliens was accomplished.

"Although the second version of *WOTW* didn't have the same effect on the audience as the first one did, it was a seminal moment in my career and had a profound and lasting effect on my vision of what radio can be." (Don Berns)

❖ Hallowe'en Listening Today

Although it's hard to predict, many radio stations in Canada and the United States may carry the original *War of the Worlds* broadcast, or one of the variants that have been made over the years. Although I am basing this on my increasingly faulty memory, I'm reasonably sure that WGN 720 and CFRB 1010 rebroadcast the Welles version years ago. Tune around the dial on the 30th or the 31st; you may hear reports of a Martian invasion! Or try here: www.archive.org/details/WAROFTEWORLD52

Also, don't forget to check your local radio stations for some great music. There are a massive number of novelty tunes and songs with a Hallowe'en theme, the most famous being the *Monster Mash*, which has the distinction of charting on three different occasions. Like Christmas music, these tunes only get played for a few days a year. Unlike Christmas music they are not overplayed.

An annual treat for those who listen online is the Treasure Island Oldies annual "Hallowe'en Spooktacular" with your host "Count" Michael Godin. The program will be on Sunday, October 28 this year from 9pm-1am (Eastern) 6-10pm (Pacific). After you load the audio, join us in the chat room (yes, I'm a regular; link on the website). You can listen and participate at the website (www.treasureislandoldies.com). The program will also be archived for a week or so after airing.

Finally, Art Bell's Coast-to-Coast AM program, heard on hundreds of radio stations overnight, airs an edition of "Ghost-to-Ghost" on or about Hallowe'en night. Callers across the country call in with their ghostly tales. It's very entertaining because you have no idea what's coming next. Best heard with the lights off in absolute darkness ☺

THE QSL REPORT

VERIFICATIONS RECEIVED BY OUR READERS

Gayle Van Horn, W4GVH

gaylevanhorn@monitoringtimes.com

One World...One Dream

Beijing has declared "we are ready," and Olympic fans are counting the days to Summer Olympics Games 2008. To mark this occasion, China Radio International is offering QSL cards and postcards of ten Olympic sites. Send your reception reports to: 16A Shijingshan Street Beijing 100040 People's Republic of China or via email crieng@cri.com.cn.

Albania's Radio Tirana is offering a new four-card series from their German service that includes: Bay of Saranda, Himara Beach, Voskoja near Korca and beach and hotel at Jale. Send German reports to: Radio Television Shqiptar, Rruga Ismail

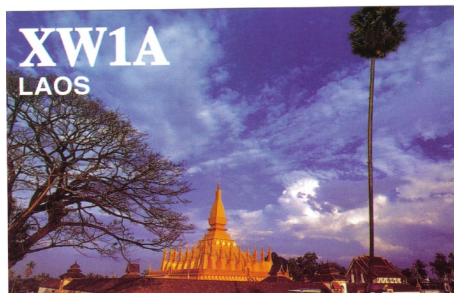


Qemali Nr. 11 Tirana, or via email: radiotirana-german@hotmail.com.

With my feature focus on pirate radio this month, here is a quick reminder of QSL policies. All reception reports to pirate stations require three first-class postage stamps for United States mail drops, or two U.S. dollars to foreign addresses. Currency defrays return postage cost for mail forwarding and a return souvenir QSL card or letter to your address. Logs may also be posted at www.frn.net/ for stations not using a mail drop. Halloween will be a prime listening opportunity for the bizarre and outrageous.

AMATEUR RADIO

Laos XW1A, 20 meters USB. Full data color scenery card of temple. Received in four months for a SWL card, address label and one IRC to QSL Manager-Champ Muangamphan, P.O. Box 1090 Kasetsart University, Bangkok 10903 Thailand. (Greg Harris WDX9KHY, Park Forest, IL)



Nicaragua YN2EJ, 10 and 40 meters SSB. Full data color card. Received in 35 days for an SASE to QSL Manager-K5LBU Charles "Frosty" Frost, 3311 Hilton Head CT, Missouri City, TX 77459. (Larry Van Horn, NC)

São Tomé S9SS (IOTA AF-023) 20 meters SSB. Full data color photo of the VOA transmitting facility at São Tomé. Received in eight days for an SASE to QSL Manager-N4JR Gerard N. Rossano, 798 County Road 350, Hollywood, AL 35752-6731. (Van Horn).

BOTSWANA

Voice of America relay 4930 kHz via Moepeng Hill. Full data 50th Anniversary Botswana Relay Verification card. Received in 23 days for follow-up report to DC address, as received no reply via Selebi-Phikwe transmitter site. QSL address: Audience Mail, 330 Independence Avenue SW, Washington, DC 20237. (John Wilkins, Wheat Ridge, CO) Email: Reception reports to: letters@voa.gov

CHINA

China Radio International, 9570, 11650 kHz. Full data Beijing 2008 One World...One Dream card featuring University of Science and Technology Beijing Gymnasium. Received in 62 days for an English report and a souvenir postcard. Station address: 16A Shijingshan Street Beijing 100040 People's Republic of China, (Frank Hillton, Charleston, SC)

CLANDESTINE

Radio Furusato no Kaze (Winds of Hometown) 9780 kHz via Taiwan. No-data letter thanking

me for writing, and stating they do not QSL. Received in 11 days for an email report to info@rachi.go.jp. Three For the Return of the Abductees brochures enclosed. Station address: Policy Planning Division, Headquarters for the Abduction Issue, Cabinet Secretariat, 1-6-1 Nagata-cho, Chiyoda-ku, Tokyo 100-8968 Japan. Some sites call this frequency Nihon, while others refer to it as Furusato. (Wendel Craighead, Prairie Village, KS)

IRAN

Voice of Islamic Republic 9905 kHz. Full data QSL card unsigned, plus letter and three books. Received in 70 days for email report to: spanishradio@irib.com with program audio clips. (Nicholas Eramo, Buenos Aires, Argentina) Station address: Islamic Republic of Iran Broadcasting, P.O. Box 19395-6767 Tehran, Iran.



Pol-e Khajur (Khajur Bridge) - Efaban/17th century

MEDIUM WAVE

KJMJ 580 kHz AM. Partial data handwritten verification on Radio Maria letterhead, with illegible signature, plus bumper sticker, schedule, info sheet and religious tracts. Received in three weeks for an AM report, \$1.00 and an address label (used). Station address: 601 Washington St., Alexandria, LA 71301. (Bill Wilkins, Springfield, MO).

WDTW 1310 kHz AM. Full data letter signed by Mike Dault-Transmitter Engineer. Received in 121 days for an AM report. Station address: 27675 Halsted Road, Farmington Hills, MI 48331 (Jim Pogue, Memphis, TN).

NORTHERN MARINAS

S.H.A.N. Herald Agency for News 9SHAN) via Radio Free Asia, 9455 kHz. Partial data acknowledgment letter signed by Khuensai Jaiyen-Director, plus mentions of their website at www.shanland.org (for English readers). Received in 36 days for a CD mp3 report and prepared card (not returned) QSL address:

P.O. Box 15, Noing Hoi, P.O. Chiangmai 5007, Thailand. (Ed Kusalik, Alberta, Canada)

PIRATE

The Crystal Ship 3275, 7275 kHz. Full data black/white card of full rigged ship modeled in crystal signed by The Poet. Received in 52 days for email report to: tcsshortwave@yahoo.com. (Joe Wood, Greenback, TN) Station mail drop: P.O. Box 1, Belfast, NY 14895 USA.

WTCR/Twentieth Century Fox Radio 6925 kHz USB. Full data card. Received in 18 days for a pirate report. Station uses Belfast mail drop (see The Crystal Ship). (Wood)

RUSSIA

Trans World Radio via Samara, Russia 11955 kHz. Full data e-qsl showing the Monitoring Post with T2F antenna, plus an email verification statement from E. Daniel Devadoss. Received in 70 days for an email report to: ddevadoss@in.twrsa.org. (Kusalik).

ST. HELENA

Radio St. Helena 11095 kHz USB. Full data Radio St. Helena 2006 Revival Transmission card, signed by Laura Lawrence, Station Manager, plus form letter. Received in six months for an English report and three IRCs. Station address: P.O. Box 24, Jamestown, St. Helena STHL 1ZZ South Atlantic Ocean. (Wilkins). Received 225 days for follow-up and \$3.00. (Mick Delmage, Alberta, Canada)

USA

Radio Martí 11845 kHz. Full data verification on station letterhead signed by Margaret Ray de Arenas-Assistant to the Director. Received in 45 days for English report and Monitoring Times postcard. Station address: Broadcasting Board of Governors, Office of Cuba Broadcasting, 4201 NW 77th Avenue, Doral, FL 33166-6728 USA. Station is currently developing new QSL cards. Website: www.martinoticias.com (Gayle Van Horn, NC).

WPVW 567 Ellensburg, WA. 530 kHz. Friendly letter signed by Rick F. Gifford-P.E., South Central Region Traffic Engineer. Received in 13 days for report to WSDOT. QSL address: 2809 Rudkin Road, Unin Gap, WA (or) P.O. Box 12560, Yakima, WA 98909-2560. (Patrick Martin, Oceanside, OR).

WQDG 929 Camas, WA. 1670 kHz. friendly letter from the Camas Police Department, signed by Tami Strunk-Community Service Director. Received in four days. QSL address: 2100 SE 3rd Avenue, Camas, WA 98607 USA. (Martin).



HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Saving Time) 4, 5, 6 or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each hour.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC Sunday will be heard on Saturday evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not daily, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Codes	
s/Sun	Sunday
m/Mon	Monday
t	Tuesday
w	Wednesday
h	Thursday
f	Friday
a/Sat	Saturday
occ:	occasional
DRM:	Digital Radio Mondiale
irreg	Irregular broadcasts
vl	Various languages
USB:	Upper Sideband

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment prob-

lems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
ca:	Central America
do:	domestic broadcast
eu:	Europe
me:	Middle East
na:	North America
pa:	Pacific
sa:	South America
va:	various

MT MONITORING TEAM

Gayle Van Horn
Frequency Manager

gaylevanhorn@monitoringtimes.com

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Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Rich D'Angelo/*NASWA Flash Sheet*; Rachel Baughn/*MT*; Wolfgang Bueschel, Germany; Bob Fraser, Belfast, ME; Alokesh Gupta, New Delhi, India; Ivo Ivanov; Stewart MacKenzie, CA; Anker Petersen/*DSWCI-DX Window*; Daniel Sampson/*PTSW*; Harold Sellers/*ODXA DX Ontario*; Bernard Trutenau, Lithuania; Andreas Volk, Germany. *CIDX*; *Cumbre DX*; *BDX Club*; *DX Mix News*; *DX Magazine*; *Hard-Core-DX*; *NASWA Journal*; *Worldwide DX Club/Top News*; *WYFR*.

Shortwave Broadcast Bands

kHz	Meters
2300-2495	120 meters (Note 1)
3200-3400	90 meters (Note 1)
3900-3950	75 meters (Regional band, used for broadcasting in Asia only)
3950-4000	75 meters (Regional band, used for broadcasting in Asia and Europe)
4750-4995	60 meters (Note 1)
5005-5060	60 meters (Note 1)
5730-5900	49 meter NIB (Note 2)
5900-5950	49 meter WARC-92 band (Note 3)
5950-6200	49 meters
6200-6295	49 meter NIB (Note 2)
6890-6990	41 meter NIB (Note 2)
7100-7300	41 meters (Regional band, not allocated for broadcasting in the western hemisphere) (Note 4)
7300-7350	41 meter WARC-92 band (Note 3)
7350-7600	41 meter NIB (Note 2)
9250-9400	31 meter NIB (Note 2)
9400-9500	31 meter WARC-92 band (Note 3)
9500-9900	31 meters
11500-11600	25 meter NIB (Note 2)
11600-11650	25 meter WARC-92 band (Note 3)
11650-12050	25 meters
12050-12100	25 meter WARC-92 band (Note 3)
12100-12600	25 meter NIB (Note 2)
13570-13600	22 meter WARC-92 band (Note 3)
13600-13800	22 meters
13800-13870	22 meter WARC-92 band (Note 3)
15030-15100	19 meter NIB (Note 2)
15100-15600	19 meters
15600-15800	19 meter WARC-92 band (Note 3)
17480-17550	17 meter WARC-92 band (Note 3)
17550-17900	17 meters
18900-19020	15 meter WARC-92 band (Note 3)
21450-21850	13 meters
25670-26100	11 meters

Notes

- Note 1 Tropical bands, 120/90/60 meters are for broadcast use only in designated tropical areas of the world.
- Note 2 Broadcasters can use this frequency range on a (NIB) non-interference basis only.
- Note 3 WARC-92 bands are allocated officially for use by HF broadcasting stations in 2007.
- Note 4 WRC-03 update. After March 29, 2009, the spectrum from 7100-7200 kHz will no longer be available for broadcast purposes and will be turned over to amateur radio operations worldwide.

**GLENN HAUSER'S
WORLD OF RADIO**
<http://www.worldofradio.com>

For the latest DX and programming news, amateur nets, DX program schedules, audio archives and much more!

0000 UTC - 8PM EDT / 7PM CDT / 5PM PDT

0000	0005	Greece, Voice of	7475eu	9420eu	15640eu
0000	0015	Japan, Radio Japan/NHK World			13650as
		17810as			
0000	0027	Czech Rep, Radio Prague	7345na	9440na	
0000	0030	Australia, HCJB Global	15525va		
0000	0030	Australia, Radio Australia	9660as	12080as	
		13690as	15240pa	17715as	17750va
		17775va	17795va		
0000	0030	Burma, Dem Voice of Burma	5955eu		
0000	0030	Egypt, Radio Cairo	9460na		
0000	0030	UK, BBC World Service	3915as	5970as	
		17615as			
0000	0030	USA, Voice of America	7555as		
0000	0045	India, All India Radio	9690as	9705as	
		11620as	11645as	13605as	
0000	0045	USA, WYFR/Family Radio FL	17805am		
0000	0056	Romania, Radio Romania Intl	9775na	11790na	
0000	0057	Canada, Radio Canada Intl	11700as		
0000	0058	Germany, Deutsche Welle	7245as	13730as	
		15595as			
0000	0059	Spain, Radio Exterior Espana	6055na		
0000	0100	Anguilla, University Network	6090am		
0000	0100	Australia, ABC NT Alice Springs		2310do	
		4835do			
0000	0100	Australia, ABC NT Katherine	5025do		
0000	0100	Australia, ABC NT Tennant Creek		4910do	
0000	0100	Canada, CFRX Toronto ON	6070na		
0000	0100	Canada, CFVP Calgary AB	6030na		
0000	0100	Canada, CKZN St John's NF	6160na		
0000	0100	Canada, CKZU Vancouver BC		6160na	
0000	0100	China, China Radio Intl	6020na	6075as	
		7180as	9570as	9725as	11885as
		13750as	15115as		
0000	0100	Costa Rica, University Network		5030va	
		6150va	7375va	9725va	
0000	0100	Guyana, Voice of 3291do			
0000	0100	Japan, Radio Japan/NHK World		6145na	
0000	0100	Malaysia, RTM/Trax FM	7295as		
0000	0100	Netherlands, Radio	9845na		
0000	0100	New Zealand, Radio NZ Intl	15720pa		
0000	0100	New Zealand, Radio NZ Intl	13730pa		
0000	0100	Papua New Guinea, Wantok R. Light		7325va	
0000	0100	Russia, Voice of 7250na	9665na	12755na	
0000	0100	Singapore, MediaCorp Radio	6150do		
0000	0100	UK, BBC World Service	6195as	9580as	
		9740as	11955as	15335as	15360as
0000	0100	UK, Bible Voice BC	6140as		
0000	0100	Ukraine, Radio Ukraine Intl	7440eu		
0000	0100	USA, American Forces Radio	4319usb	5446usb	
		5765usb	6350usb	7811usb	10320usb
		12133usb	13362usb		
0000	0100	USA, KAIJ Dallas TX	5755va		
0000	0100	USA, KTBN Salt Lake City UT	7505na	15590na	
0000	0100	USA, WBCQ Monticello ME	9330am		
0000	0100	USA, WBOH Newport NC	5920am		
0000	0100	USA, WEWN Vandiver AL	5810na		
0000	0100	USA, WHRA Greenbush ME	7520na		
0000	0100	USA, WHRI Cypress Creek SC		7315am	
		7520am			
0000	0100	USA, WHRI Cypress Creek SC		9515am	
0000	0100	USA, WHRI Cypress Creek SC		7490am	
0000	0100	USA, WINB Red Lion PA	9265am		
0000	0100	USA, WRMI Miami FL	9955va		
0000	0100	USA, WTJC Newport NC	9370na		
0000	0100	USA, WWCN Nashville TN	5070na	7465na	
		13845na			
0000	0100	USA, WWRB Manchester TN	5745am		
0000	0100	USA, WWRB Manchester TN	3185va	5050va	
		6890na			
0000	0100	USA, WYFR/Family Radio FL	6065am	9595am	
		11835am			
0005	0100	Canada, Radio Canada Intl	6100na		
0030	0045	Germany, Pan American BC	6165as		
0030	0100	Australia, Radio Australia	9660as	12080as	
		13690as	15240pa	15415as	17715as
		17750va	17775va	17795va	
0030	0100	Lithuania, Radio Vilnius	11690na		
0030	0100	Thailand, Radio	5890na	9570af	
0030	0100	UK, Bible Voice BC	9620as		
0030	0100	USA, Voice of America	9715va	9780va	
		11725va	15185va	15205va	15290va
		15560va	17820va		
0030	0100	USA, WYFR/Family Radio FL	9620as		
0035	0058	Austria, Radio Austria Intl	9870am		
0043	0058	Austria, Radio Austria Intl	9870am		

0100 UTC - 9PM EDT / 8PM CDT / 6PM PDT

0100	0104	Canada, Radio Canada Intl	6100na		
0100	0127	Czech Rep, Radio Prague	6200na	7345na	
0100	0127	Slovakia, Radio Slovakia Int	5930na	9440sa	
0100	0130	Australia, Radio Australia	9660as	12080as	
		13690as	15240pa	15415as	17715as
		17775va	17795va		
0100	0200	Anguilla, University Network	6090am		
0100	0200	Australia, ABC NT Katherine	5025do		
0100	0200	Australia, ABC NT Tennant Creek		4910do	
0100	0200	Canada, CFRX Toronto ON	6070na		
0100	0200	Canada, CFVP Calgary AB	6030na		
0100	0200	Canada, CKZN St John's NF	6160na		
0100	0200	Canada, CKZU Vancouver BC		6160na	
0100	0200	China, China Radio Intl	6020na	9470eu	
		9535as	9570na	9580na	9725eu
		9790na	11870as	15115as	15785as
0100	0200	Costa Rica, University Network		5030va	
		6150va	7375va	9725va	
0100	0200	Cuba, Radio Havana	6000na	6180na	
0100	0200	Guyana, Voice of 3291do			
0100	0200	Indonesia, Voice of	9525as	11785pa	
		15150al			
0100	0200	Japan, Radio Japan/NHK World		5960va	
		11780as	11935na	15235as	15325as
		17560va	17685pa	17810as	17825va
0100	0200	Malaysia, RTM/Trax FM	7295as		
0100	0200	Netherlands, Radio	9845na		
0100	0200	New Zealand, Radio NZ Intl	15720pa		
0100	0200	New Zealand, Radio NZ Intl	13730pa		
0100	0200	North Korea, Voice of Korea	7140as	9345as	
		9730as	11735ca	13760ca	15180ca
0100	0200	Papua New Guinea, Wantok R. Light		7325va	
0100	0200	Russia, Voice of 7250na	9665na	12775na	
0100	0200	Singapore, MediaCorp Radio	6150do		
0100	0200	Sri Lanka, SLBC	6005as	9770as	15745as
0100	0200	Taiwan, Radio Taiwan Intl	11875as	15465na	
0100	0200	UK, BBC World Service	6195as	9410as	
		9580as	11750as	11955as	15310as
		15335as	15360as		
0100	0200	UK, Bible Voice BC	6140as		
0100	0200	USA, American Forces Radio	4319usb	5446usb	
		5765usb	6350usb	7811usb	10320usb
		12133usb	13362usb		
0100	0200	USA, KAIJ Dallas TX	5755va		
0100	0200	USA, KTBN Salt Lake City UT	7505na		
0100	0200	USA, WBCQ Monticello ME	9330am		
0100	0200	USA, WBOH Newport NC	5920am		
0100	0200	USA, WHRI Cypress Creek SC		5850am	
		7315am	7490am		
0100	0200	USA, WINB Red Lion PA	9265am		
0100	0200	USA, WRMI Miami FL	9955va		
0100	0200	USA, WRMI Miami FL	7385na		
0100	0200	USA, WTJC Newport NC	9370na		
0100	0200	USA, WWCN Nashville TN	3215na	5070na	
		7465na	13845na		
0100	0200	USA, WWRB Manchester TN	5745am		
0100	0200	USA, WWRB Manchester TN	3185va	5050va	
		6890na			
0100	0200	USA, WYFR/Family Radio FL	6065am	9595am	
0100	0200	Uzbekistan, CVC International		11790as	
0105	0128	Austria, Radio Austria Intl	9870am		
0113	0128	Austria, Radio Austria Intl	9870am		
0115	0130	Australia, HCJB Global	15405va		
0130	0200	Australia, Radio Australia	9660as	12080as	
		13690as	15240pa	15415as	17715as
		17795va			
0130	0200	Iran, Voice of the Islamic Rep	7235na	9495na	
0130	0200	Sweden, Radio	6010na	11675va	
0130	0200	USA, Voice of America	6040am	13740am	
0140	0200	Vatican City, Vatican Radio	5915va	7335va	
0143	0158	Austria, Radio Austria Intl	9870am		
0145	0200	Albania, Radio Tirana	6120eu	7425na	

0200 UTC - 10PM EDT / 9PM CDT / 7PM PDT

0200	0215	Croatia, Croatian Radio	6165na	9925eu	
0200	0230	Iran, Voice of the Islamic Rep	7235na	9495na	
0200	0230	South Korea, KBS World Radio		15575sa	
0200	0245	USA, WYFR/Family Radio FL	11835na		
0200	0258	New Zealand, Radio NZ Intl	13730pa		
0200	0300	Anguilla, University Network	6090am		

0200	0300	twhfa	Argentina, RAE	11710am		
0200	0300		Australia, ABC NT Alice Springs	4835do	2310do	
0200	0300		Australia, ABC NT Katherine	5025do		
0200	0300		Australia, ABC NT Tennant Creek		4910do	
0200	0300		Australia, Radio Australia	9660as	12080as	
			13690as	15240pa	15415as	15515as
			21725va			
0200	0300		Bulgaria, Radio	9700na	11700na	
0200	0300		Canada, CFRX Toronto ON	6070na		
0200	0300		Canada, CFVP Calgary AB	6030na		
0200	0300		Canada, CKZN St John's NF	6160na		
0200	0300		Canada, CKZU Vancouver BC		6160na	
0200	0300		China, China Radio Intl	11770as	13640as	
0200	0300		Costa Rica, University Network		5030va	
			6150va	7375va	9725va	
0200	0300		Cuba, Radio Havana	6000na	6180na	
0200	0300		Egypt, Radio Cairo	7270na		
0200	0300		Guyana, Voice of 3291do			
0200	0300		Malaysia, RTM/Trax FM	7295as		
0200	0300	DRM	Netherlands, Radio	9405va		
0200	0300		New Zealand, Radio NZ Intl	15720pa		
0200	0300		North Korea, Voice of Korea	13650as	15100as	
0200	0300	vl	Papua New Guinea, Wantok R. Light	7325va		
0200	0300		Philippines, Radio Pilipinas	11880va	15285va	
			15510va			
0200	0300		Russia, Voice of	9665na	9860na	13635na
			13775na			
0200	0300		Singapore, MediaCorp Radio	6150do		
0200	0300		Sri Lanka, SLBC	6005as	9770as	15745as
0200	0300		Thailand, Radio	5890na		
0200	0300		UK, BBC World Service	6030af	6195as	
			11750as	11955as	15310as	15335as
			15360as	17790as		
0200	0300		USA, American Forces Radio	4319usb	5446usb	
			5765usb	6350usb	7811usb	10320usb
			12133usb	13362usb		
0200	0300		USA, KAIJ Dallas TX	5755va		
0200	0300		USA, KJES Vado NM	7555na		
0200	0300		USA, KJES Vado NM	7555na		
0200	0300		USA, KTBN Salt Lake City UT	7505na		
0200	0300		USA, KWHR Naalehu HI	17655as		
0200	0300		USA, WBCQ Monticello ME	5110am	7415na	
			9330na			
0200	0300	Sun	USA, WBCQ Monticello ME	9330am		
0200	0300		USA, WBOH Newport NC	5920am		
0200	0300		USA, WEWN Vandiver AL	5810na		
0200	0300		USA, WHRA Greenbush ME	5890na		
0200	0300		USA, WHRI Cypress Creek SC		5850am	
			7315am			
0200	0300		USA, WINB Red Lion PA	9265am		
0200	0300	sm	USA, WRMI Miami FL	9955va		
0200	0300	twhfa	USA, WRMI Miami FL	7385na		
0200	0300		USA, WTJC Newport NC	9370na		
0200	0300		USA, WWCR Nashville TN	3215na	5070na	
			5935na			
0200	0300	mtwhfa	USA, WWRB Manchester TN	5745am		
0200	0300		USA, WWRB Manchester TN	3185va	5050va	
			6890na			
0200	0300		USA, WYFR/Family Radio FL	5985am	11855am	
0200	0300		Uzbekistan, CVC International		11790as	
0200	3000		Taiwan, Radio Taiwan Intl	5950na	9680am	
0215	0230		Nepal, Radio	3230as	5005as	6100as
			7165as			
0230	0300	twhf	Albania, Radio Tirana	6115eu	7425eu	
0230	0300		South Korea, KBS World Radio		9560na	
0230	0300		Sweden, Radio	6010na		
0245	0300		India, All India Radio	7420as		
0245	0300		Myanmar, Radio	9730do		
0250	0300		Vatican City, Vatican Radio	6040va	7305va	
0255	0300	vl	Rwanda, Radio	6055do		
0259	0300	DRM	New Zealand, Radio NZ Intl	11675pa		

0300 UTC - 11PM EDT / 10PM CDT / 8PM PDT

0300	0320		Vatican City, Vatican Radio	6040va	7305va	
			15560va			
0300	0327		Czech Rep, Radio Prague	7345na	9870na	
0300	0330		Egypt, Radio Cairo	7270na		
0300	0330		Myanmar, Radio	9730do		
0300	0330		Philippines, Radio Pilipinas	11880va	15285va	
			15510va			
0300	0330		USA, KJES Vado NM	7555na		
0300	0330		USA, Voice of America	4930af	6080af	
			7340af	9885af	12080af	15580af
0300	0330	Sun	USA, WBCQ Monticello ME	9330am		
0300	0330		Vatican City, Vatican Radio	9660af		
0300	0355		South Africa, Channel Africa	5960af		
0300	0356		Romania, Radio Romania Intl	6150va	9645na	
			11895va	15220va		

0300	0359		South Africa, Channel Africa	3345af		
0300	0400		Anguilla, University Network	6090am		
0300	0400		Australia, ABC NT Alice Springs	4835do	2310do	
			4835do			
0300	0400		Australia, ABC NT Katherine	5025do		
0300	0400		Australia, ABC NT Tennant Creek		4910do	
0300	0400		Australia, Radio Australia	9660as	12080as	
			13690as	15240pa	15415as	15515as
			21725va			
0300	0400	twhf	Canada, CBC NQ SW Service	9625na		
0300	0400		Canada, CFRX Toronto ON	6070na		
0300	0400		Canada, CFVP Calgary AB	6030na		
0300	0400		Canada, CKZN St John's NF	6160na		
0300	0400		Canada, CKZU Vancouver BC		6160na	
0300	0400		China, China Radio Intl	9690na	9790na	
			11770as	15110as	15120as	15785as
0300	0400		Costa Rica, University Network		5030va	
			6150va	7375va	9725va	
0300	0400		Cuba, Radio Havana	6000na	6180na	
0300	0400		Germany, Deutsche Welle	11695as	13810as	
0300	0400		Guyana, Voice of 3291do			
0300	0400		Japan, Radio Japan/NHK World		21610pa	
0300	0400		Malaysia, RTM/Trax FM	7295as		
0300	0400		Malaysia, RTM/Voice of Malaysia		6175as	
			9750as	15295as		
0300	0400		New Zealand, Radio NZ Intl	15720pa		
0300	0400	DRM	New Zealand, Radio NZ Intl	11675pa		
0300	0400		North Korea, Voice of Korea	7140as	9345as	
			9730as			
0300	0400		Oman, Radio Oman	15355as		
0300	0400	vl	Papua New Guinea, Wantok R. Light	7325va		
0300	0400	DRM	Russia, Voice of	15735as		
0300	0400		Russia, Voice of	5990na	9435na	9515na
			9665na	9860na	12065na	13635na
0300	0400	vl	Rwanda, Radio	6055do		
0300	0400		Singapore, MediaCorp Radio	6150do		
0300	0400		Sri Lanka, SLBC	6005as	9770as	15745as
0300	0400		Taiwan, Radio Taiwan Intl	5950am	15215sa	
0300	0400		Turkey, Voice of	5975va	7270va	
0300	0400	Sun	UK, BBC World Service	11760as		
0300	0400		UK, BBC World Service	3255af	6005af	
			6030af	6190af	6195as	9750af
			12035af	15310as	15360as	15575as
			17760as	21660as		
0300	0400		Ukraine, Radio Ukraine Intl	7440na		
0300	0400		USA, American Forces Radio	4319usb	5446usb	
			5765usb	6350usb	7811usb	10320usb
			12133usb	13362usb		
0300	0400		USA, KAIJ Dallas TX	5755va		
0300	0400		USA, KTBN Salt Lake City UT	7505na		
0300	0400		USA, KWHR Naalehu HI	17655as		
0300	0400		USA, WBCQ Monticello ME	5110am	7415na	
0300	0400		USA, WBOH Newport NC	5920am		
0300	0400		USA, WEWN Vandiver AL	5810na		
0300	0400		USA, WHRA Greenbush ME	5890na		
0300	0400	mtwhf	USA, WHRI Cypress Creek SC		5835am	
0300	0400		USA, WHRI Cypress Creek SC		5850am	
			7490am			
0300	0400	Sat/Sun	USA, WHRI Cypress Creek SC		7315am	
0300	0400		USA, WINB Red Lion PA	9265am		
0300	0400		USA, WRMI Miami FL	9955va		
0300	0400		USA, WTJC Newport NC	9370na		
0300	0400		USA, WWCR Nashville TN	3215na	5070na	
			5935na	7465na		
0300	0400		USA, WWRB Manchester TN	3185va	5050va	
0300	0400		USA, WYFR/Family Radio FL	6065na	9505na	
			11740na	15255na		
0300	0400		Uzbekistan, CVC International		13680as	
0330	0335		Bahrain, Radio Bahrain	6010as		
0330	0345		Israel, Kol Israel	9345eu	11590va	17600va
0330	0355		Vietnam, Voice of	6175na		
0330	0357		Czech Rep, Radio Prague		6080as	9445as
			11600as			
0330	0400		UK, BBC World Service	15420af		
0330	0400		USA, Voice of America	4930af	6080af	
			9885af	12080af	15580af	
0330	0400	twhf	USA, WBCQ Monticello ME	9330am		

0400 UTC - 12AM EDT / 11PM CDT / 9PM PDT

0400	0430		Australia, Radio Australia	9660as	12080as	
			13690as	15240pa	15515as	21725va
0400	0430	mtwhf	France, Radio France Intl	9805af	11995af	
0400	0430		Sri Lanka, SLBC	6005as	9770as	15745as
0400	0430	Sat/Sun	USA, WWRB Manchester TN	5745am		
0400	0445		USA, WYFR/Family Radio FL	6065na	9505na	
0400	0458		New Zealand, Radio NZ Intl	15720pa		
0400	0458	DRM	New Zealand, Radio NZ Intl	11675pa		
0400	0500		Anguilla, University Network	6090am		
0400	0500		Armenia, CVC International	15515as		

0400	0500		Australia, ABC NT Alice Springs	2310do	
			4835do		
0400	0500		Australia, ABC NT Katherine	5025do	
0400	0500		Australia, ABC NT Tennant Creek	4910do	
0400	0500	twfhf	Canada, CBC NQ SW Service	9625na	
0400	0500		Canada, CFRX Toronto ON	6070na	
0400	0500		Canada, CKZN St John's NF	6160na	
0400	0500		Canada, CKZU Vancouver BC	6160na	
0400	0500		China, China Radio Intl	6020na	6080as
			13750as	15120as	15785as
			17855as		17725as
0400	0500		Costa Rica, University Network	5030va	
			6150va	7375va	9725va
0400	0500		Cuba, Radio Havana	6000na	6180na
0400	0500		Germany, Deutsche Welle	7225af	7245af
			12045af	15445af	
0400	0500		Guyana, Voice of	3291do	
0400	0500		Malaysia, RTM/Trax FM	7295as	
0400	0500		Malaysia, RTM/Voice of Malaysia	6175as	
			9750as	15295as	
0400	0500		Netherlands, Radio	6165na	
0400	0500	vl	Papua New Guinea, Wantok R. Light	7325va	
0400	0500		Russia, Voice of	9435na	9515na
			9880na	13635na	13775na
0400	0500	DRM	Russia, Voice of	15735as	
0400	0500	vl	Rwanda, Radio	6055do	
0400	0500		Singapore, MediaCorp Radio	6150do	
0400	0500	vl	Uganda, Radio	4976do	5026do
0400	0500	DRM	UK, BBC World Service	7440eu	
0400	0500		UK, BBC World Service	3255af	6005af
			6190af	7120af	7160af
			11760as	12035af	12095eu
			15360as	15460af	15565eu
			17760as	17790as	21660as
0400	0500		USA, American Forces Radio	4319usb	5446usb
			5765usb	6350usb	7811usb
			12133usb	13362usb	10320usb
0400	0500		USA, KAIJ Dallas TX	5755va	
0400	0500		USA, KTBN Salt Lake City UT	7505na	
0400	0500		USA, KWHR Naalehu HI	17655as	
0400	0500		USA, Voice of America	4930af	4960af
			6080af	9575af	11835af
			15580af		12080af
0400	0500		USA, WBCQ Monticello ME	5110am	7415na
0400	0500		USA, WBOH Newport NC	5920am	
0400	0500		USA, WEWN Vandiver AL	5810na	
0400	0500		USA, WHRA Greenbush ME	5890na	
0400	0500	mtwhf	USA, WHRI Cypress Creek SC		5835am
0400	0500	Sat/Sun	USA, WHRI Cypress Creek SC		7315am
0400	0500		USA, WHRI Cypress Creek SC		7490am
0400	0500		USA, WMLK Bethel PA	9265va	
0400	0500		USA, WRMI Miami FL	9955va	
0400	0500		USA, WTJC Newport NC	9370na	
0400	0500		USA, WWCR Nashville TN	3215na	5070na
			5890na	5935na	
0400	0500		USA, WWRB Manchester TN	3185va	5050va
			6890na		
0400	0500		USA, WYFR/Family Radio FL	6855na	7780va
			9715am		
0400	0500		Uzbekistan, CVC International		13680as
0430	0500		Australia, Radio Australia	9660as	12080as
			13690as	15240pa	15415as
			21725va		15515va
0430	0500		Nigeria, Radio/Kaduna	6090do	
0430	0500		Swaziland, TWR	3200af	4775af
0430	0500	Sat	USA, WWRB Manchester TN	5745am	
0459	0500	DRM	New Zealand, Radio NZ Intl	9890pa	

0500 UTC - 1AM EDT / 12AM CDT / 10PM PDT

0500	0507	twfhf	Canada, CBC NQ SW Service	9625na	
0500	0515	Sun	Sri Lanka, SLBC	6005as	9770as
0500	0530		Australia, Radio Australia	9660as	12080as
			13690as	15240pa	15515as
0500	0530	mtwhf	France, Radio France Intl	11995af	13680af
0500	0530		Germany, Deutsche Welle	5945af	9700af
0500	0530		Vatican City, Vatican Radio	4005eu	7250eu
			9660af	11625af	13765af
0500	0555		South Africa, Channel Africa	9685af	
0500	0559		South Africa, Channel Africa	7240af	
0500	0600		Anguilla, University Network	6090am	
0500	0600		Armenia, CVC International	15515as	
0500	0600		Australia, ABC NT Alice Springs	2310do	
			4835do		
0500	0600		Australia, ABC NT Katherine	5025do	
0500	0600		Australia, ABC NT Tennant Creek	4910do	
0500	0600		Bhutan, BBS	6035as	
0500	0600		Canada, CFRX Toronto ON	6070na	
0500	0600		Canada, CKZN St John's NF	6160na	
0500	0600		Canada, CKZU Vancouver BC	6160na	

0500	0600		China, China Radio Intl	6020na	6190na
			11710af	11880as	15350as
			17505as	17540as	17725as
0500	0600		Costa Rica, University Network		5030va
			6150va	7375va	9725va
0500	0600		Cuba, Radio Havana	6000na	6060na
			6180na	9550va	9600va
0500	0600		Germany, CVC Intl/Voice Africa		9430af
0500	0600		Guyana, Voice of	3291do	
0500	0600		Japan, Radio Japan/NHK World		5975eu
			6110na	7230eu	15195as
			21755pa		17810as
0500	0600		Kuwait, Radio Kuwait	15110as	
0500	0600		Malaysia, RTM/Trax FM	7295as	
0500	0600		Malaysia, RTM/Voice of Malaysia	6175as	
			9750as	15295as	
0500	0600		New Zealand, Radio NZ Intl	9615pa	
0500	0600	DRM	New Zealand, Radio NZ Intl	9890pa	
0500	0600		Nigeria, Radio/Kaduna	4770do	6090al
0500	0600	vl	Papua New Guinea, Wantok R. Light		7325va
0500	0600		Russia, Voice of	17635pa	21790pa
0500	0600	DRM	Russia, Voice of	15735as	
0500	0600		Singapore, MediaCorp Radio	6150do	
0500	0600		Swaziland, TWR	3200af	4775af
0500	0600	vl	Uganda, Radio	4976do	5026do
0500	0600	DRM	UK, BBC World Service	7440eu	
0500	0600		UK, BBC World Service	3255af	6005af
			6190af	6195af	7160af
			11695af	11760as	11765af
			12095eu	15310as	15360as
			15565eu	17640af	17760as
			17885af	21660as	
0500	0600		Ukraine, Radio Ukraine Intl	9945eu	
0500	0600		USA, American Forces Radio	4319usb	5446usb
			5765usb	6350usb	7811usb
			12133usb	13362usb	10320usb
0500	0600		USA, KAIJ Dallas TX	5755va	
0500	0600		USA, KTBN Salt Lake City UT	7505na	
0500	0600		USA, KWHR Naalehu HI	13650as	
0500	0600		USA, Voice of America	4930af	6080af
			6180af	12080af	15580af
0500	0600		USA, WBCQ Monticello ME	5110am	7415na
0500	0600		USA, WBOH Newport NC	5920am	
0500	0600		USA, WEWN Vandiver AL	5850na	
0500	0600	Sat/Sun	USA, WHRA Greenbush ME	6145na	
0500	0600		USA, WHRI Cypress Creek SC		7315am
0500	0600		USA, WMLK Bethel PA	9265va	
0500	0600		USA, WRMI Miami FL	9955va	
0500	0600		USA, WTJC Newport NC	9370na	
0500	0600		USA, WWCR Nashville TN	3215na	5070na
			5890na	5935na	
0500	0600		USA, WWRB Manchester TN	3185va	
0500	0600		USA, WYFR/Family Radio FL	6855na	9355va
0500	0600		Uzbekistan, CVC International		13680as
0500	0600		Zambia, CVC International	9430af	
0505	0520	m	Austria, Radio Austria Intl	17870me	
0505	0530	Sat/Sun	Austria, Radio Austria Intl	17870me	
0515	0530	vl	Rwanda, Radio	6055do	
0530	0556		Romania, Radio Romania Intl	9655va	11830va
			15435va	17770va	
0530	0600		Australia, Radio Australia	9660as	12080as
			13690as	15240pa	15415as
0530	0600	vl	Rwanda, Radio	6055do	
0530	0600		Thailand, Radio	17655eu	
0535	0600	Sat/Sun	Austria, Radio Austria Intl	17870me	
0545	0600	twfhf	Austria, Radio Austria Intl	17870me	

0600 UTC - 2AM EDT / 1AM CDT / 11PM PDT

0600	0603		Croatia, Croatian Radio	6165eu	9470eu
			11610eu		
0600	0615	Sat/Sun	South Africa, TWR	11640af	
0600	0630		Australia, Radio Australia	9660as	12080as
			13690as	15240pa	
0600	0630	Sat/Sun	Australia, Radio Australia	15290va	15415va
			15515va		
0600	0630	mtwhf	France, Radio France Intl	9765af	11725af
0600	0630		Germany, Deutsche Welle	7310af	15275af
0600	0630	mtwhf	Nigeria, Radio, Natl Svc/Abuja		7275do
0600	0630	mtwhf	UK, Sudan Radio Service	15440af	15505af
0600	0645	mtwhf	South Africa, TWR	11640af	
0600	0655		South Africa, Channel Africa	15255af	
0600	0658		New Zealand, Radio NZ Intl	9615pa	
0600	0658	DRM	New Zealand, Radio NZ Intl	9890pa	
0600	0700		Anguilla, University Network	6090am	
0600	0700		Armenia, CVC International	15515as	
0600	0700		Australia, ABC NT Alice Springs	2310do	
			4835do		
0600	0700		Australia, ABC NT Katherine	5025do	
0600	0700		Australia, ABC NT Tennant Creek	4910do	

0600	0700	Australia, CVC International	15335as	
0600	0700	Canada, CFRX Toronto ON	6070na	
0600	0700	Canada, CFVP Calgary AB	6030na	
0600	0700	Canada, CKZN St John's NF	6160na	
0600	0700	Canada, CKZU Vancouver BC	6160na	
0600	0700	China, China Radio Intl	11710af	11870as
		11880as	13660as	15140as
		15465as	17505as	17505as
		17710as		17540as
0600	0700	Costa Rica, University Network	5030va	
		6150va	7375va	9725va
0600	0700	Cuba, Radio Havana	6000va	6060va
		6180na	9550va	9600va
				11760va
0600	0700	Germany, CVC Intl/Voice Africa	15640af	
0600	0700	Greece, Voice of	11645eu	
0600	0700	Guyana, Voice of	3291do	
0600	0700	Japan, Radio Japan/NHK World	7230eu	
		11740as	11760as	13630va
		17870pa	21755pa	15195pa
0600	0700	Kuwait, Radio Kuwait	15110as	
0600	0700	Liberia, ELWA	4760do	
0600	0700	Malaysia, RTM/Trax FM	7295as	
0600	0700	Malaysia, RTM/Voice of Malaysia	6175as	
		9750as	15295as	
0600	0700	Nigeria, Radio/Kaduna	4770do	6090al
0600	0700	Papua New Guinea, Wantok R. Light	7325va	
0600	0700	Russia, Voice of	17635pa	21790pa
0600	0700	Singapore, MediaCorp Radio	6150do	
0600	0700	Solomon Islands, SIBC	5020do	9545al
0600	0700	Swaziland, TWR	3200af	9500af
0600	0700	UK, BBC World Service	17885af	
0600	0700	UK, BBC World Service	3255af	6005af
		6190af	7475eu	7475eu
		9860as	11695as	11760af
		11955af	12095as	15310as
		15400af	17640as	17790af
		21660af		
0600	0700	UK, BBC World Service	7440eu	
0600	0700	USA, American Forces Radio	4319usb	5446usb
		5765usb	6350usb	7811usb
		12133usb	13362usb	10320usb
0600	0700	USA, KAIJ Dallas TX	5755va	
0600	0700	USA, KTBN Salt Lake City UT	7505na	
0600	0700	USA, KWHR Naalehu HI	13650as	
0600	0700	USA, Voice of America	6080af	6180af
		12080af	15580af	
0600	0700	USA, WBCQ Monticello ME	5110am	7415na
0600	0700	USA, WBOH Newport NC	5920am	
0600	0700	USA, WEWN Vandiver AL	5850na	7570eu
0600	0700	USA, WHRA Greenbush ME	7490na	
0600	0700	USA, WHRI Cypress Creek SC	7335am	
		7365am	7490am	
0600	0700	USA, WMLK Bethel PA	9265va	
0600	0700	USA, WRMI Miami FL	9955va	
0600	0700	USA, WTJC Newport NC	9370na	
0600	0700	USA, WWCR Nashville TN	3215na	5070na
		5890na	5935na	
0600	0700	USA, WWRB Manchester TN	3185va	
0600	0700	USA, WYFR/Family Radio FL	6000am	7780va
		9680na	11530af	11580va
0600	0700	Vanuatu, Radio	4960do	
0600	0700	Yemen, Rep of Yemen Radio	9780me	
0600	0700	Zambia, CVC International	13650af	
0630	0700	Australia, Radio Australia	9660as	12080as
		13690as	15240pa	15415as
0630	0700	Bulgaria, Radio	9600eu	11600eu
0630	0700	UK, BBC World Service	11990af	
0630	0700	UK, Sudan Radio Service	11945af	
0630	0700	UK, Sudan Radio Service	15445af	
0630	0645	Vatican City, Vatican Radio	4005va	6185eu
		7250eu	9645eu	11740eu
		13765eu	15570af	15595af
0645	0700	Albania, TWR Europe	11865eu	
0645	0700	Monaco, TWR Europe	9800eu	
0659	0700	New Zealand, Radio NZ Intl	7145pa	

0700 UTC - 3AM EDT / 2AM CDT / 12AM PDT

0700	0705	UK, BBC World Service	6005af	
0700	0727	Czech Rep, Radio Prague	9880eu	11600eu
0700	0727	Slovakia, Radio Slovakia Int	9440pa	15460pa
0700	0730	France, Radio France Intl	13675af	
0700	0745	USA, WYFR/Family Radio FL	7780va	
0700	0750	Albania, TWR Europe	11865eu	
0700	0750	Monaco, TWR Europe	9800eu	
0700	0800	Anguilla, University Network	6090am	
0700	0800	Australia, ABC NT Alice Springs	2310do	
		4835do		
0700	0800	Australia, ABC NT Katherine	5025do	
0700	0800	Australia, ABC NT Tennant Creek	4910do	

0700	0800	Australia, CVC International	15335as	
0700	0800	Australia, Radio Australia	9660as	9710as
		12080as	13630as	15240pa
				15415as
0700	0800	Canada, CFRX Toronto ON	6070na	
0700	0800	Canada, CFVP Calgary AB	6030na	
0700	0800	Canada, CKZN St John's NF	6160na	
0700	0800	Canada, CKZU Vancouver BC	6160na	
0700	0800	China, China Radio Intl	11880as	13660as
		13710as	15450as	15465eu
		17540as	17710as	17490eu
0700	0800	Costa Rica, University Network	5030va	
		6150va	7375va	9725va
				11870va
0700	0800	Germany, CVC Intl/Voice Africa	15640af	
0700	0800	Guyana, Voice of	3291do	5950do
0700	0800	Kuwait, Radio Kuwait	15110as	
0700	0800	Liberia, ELWA	4760do	
0700	0800	Liberia, Star Radio	9525af	
0700	0800	Malaysia, RTM/Trax FM	7295as	
0700	0800	Malaysia, RTM/Voice of Malaysia	6175as	
		9750as	15295as	
0700	0800	Myanmar, Radio	9730do	
0700	0800	New Zealand, Radio NZ Intl	6095pa	
0700	0800	New Zealand, Radio NZ Intl	6095pa	
0700	0800	New Zealand, Radio NZ Intl	7145pa	
0700	0800	Nigeria, Radio/Kaduna	4770do	6090al
0700	0800	Papua New Guinea, Wantok R. Light	7325va	
0700	0800	Russia, Voice of	17495pa	17635pa
0700	0800	Singapore, MediaCorp Radio	6150do	
0700	0800	Solomon Islands, SIBC	5020do	9545al
0700	0800	Swaziland, TWR	4775af	9500af
0700	0800	Taiwan, Radio Taiwan Intl	5950am	
0700	0800	UK, BBC World Service	9470eu	
0700	0800	UK, BBC World Service	6190af	7320eu
		9470eu	9860af	11695as
		11765af	11955as	12095af
		15360as	15400af	15310as
		17830af	21660as	15775as
0700	0800	UK, BBC World Service	17885af	
0700	0800	UK, Bible Voice BC	5945eu	
0700	0800	Ukraine, Radio Ukraine Intl	9945eu	
0700	0800	USA, American Forces Radio	4319usb	5446usb
		5765usb	6350usb	7811usb
		12133usb	13362usb	10320usb
0700	0800	USA, KAIJ Dallas TX	5755va	
0700	0800	USA, KTBN Salt Lake City UT	7505na	
0700	0800	USA, KWHR Naalehu HI	13650as	
0700	0800	USA, WBCQ Monticello ME	5110am	7415na
0700	0800	USA, WBOH Newport NC	5920am	
0700	0800	USA, WEWN Vandiver AL	5850na	7570eu
0700	0800	USA, WHRI Cypress Creek SC	7335am	
		7365am		
0700	0800	USA, WMLK Bethel PA	9265va	
0700	0800	USA, WRMI Miami FL	9955va	
0700	0800	USA, WTJC Newport NC	9370na	
0700	0800	USA, WWCR Nashville TN	3215na	5070na
		5890na	5935na	
0700	0800	USA, WWRB Manchester TN	3185va	
0700	0800	USA, WYFR/Family Radio FL	5985na	6855na
		9505am	9715am	9930af
0700	0800	Vanuatu, Radio	4960do	
0700	0800	Zambia, CVC International	13650af	
0715	0750	Albania, TWR Europe	11865eu	
0715	0750	Monaco, TWR Europe	9800eu	
0730	0800	Australia, HCJB Global	11750pa	
0730	0800	Pakistan, Radio	15100eu	17835eu

0800 UTC - 4AM EDT / 3AM CDT / 1AM PDT

0800	0815	Sat	UK, Bible Voice BC	5945eu
0800	0820	mtwhfs	Albania, TWR Europe	11865eu
0800	0820	mtwhfs	Monaco, TWR Europe	9800eu
0800	0825		Malaysia, RTM/Voice of Malaysia	6175as
			9750as	15295as
0800	0830		Australia, ABC NT Katherine	5025do
0800	0830		Australia, ABC NT Tennant Creek	4910do
0800	0830		Myanmar, Radio	9730do
0800	0830		Pakistan, Radio	15100eu
0800	0845	Sat	Guam, TWR/KTWR	11840pa
0800	0845	Sun	UK, Bible Voice BC	5945eu
0800	0845		USA, WYFR/Family Radio FL	9930af
0800	0900		Anguilla, University Network	6090am
0800	0900		Australia, ABC NT Alice Springs	2310do
			4835do	
0800	0900		Australia, CVC International	15335as
0800	0900		Australia, HCJB Global	11750pa
0800	0900		Australia, Radio Australia	9580va
			9710as	13630as
				15415as
0800	0900		Canada, CFRX Toronto ON	6070na
0800	0900		Canada, CFVP Calgary AB	6030na
0800	0900		Canada, CKZN St John's NF	6160na

0800	0900	Canada, CKZU Vancouver BC	6160na	
0800	0900	China, China Radio Intl	11620as	11880as
		13710eu	15350as	15465as
		17540as		17490eu
0800	0900	Costa Rica, University Network	5030va	
		6150va	7375va	9725va
				11870va
0800	0900	Germany, CVC Intl/Voice Africa	15640af	
0800	0900	vi Greece, Voice of	9420eu	15630eu
0800	0900	mtwhf Guam, TWR/KTWR	11840pa	
0800	0900	Guyana, Voice of	3291do	5950do
0800	0900	Indonesia, Voice of	9525as	11785pa
		15150al		
0800	0900	Sat Latvia, Radio SWH	9290eu	
0800	0900	vi Liberia, ELWA	4760do	
0800	0900	Malaysia, RTM/Trax FM	7295as	
0800	0900	New Zealand, Radio NZ Intl	6095pa	
0800	0900	DRM New Zealand, Radio NZ Intl	7145pa	
0800	0900	Nigeria, Radio/Kaduna	4770do	6090al
0800	0900	Nigeria, Voice of/Ext. Svc Lagos	9690af	
0800	0900	Papua New Guinea, NBC	4890do	
0800	0900	vi Papua New Guinea, Wantok R. Light	7325va	
0800	0900	Russia, Voice of	17495pa	17635pa
0800	0900	DRM Russia, Voice of	12060eu	15780eu
0800	0900	Singapore, MediaCorp Radio	6150do	
0800	0900	vi Solomon Islands, SIBC	5020do	9545al
0800	0900	South Africa, Channel Africa	9620af	
0800	0900	South Korea, KBS World Radio	9570as	
0800	0900	Swaziland, TWR	4775af	6120af
0800	0900	Taiwan, Radio Taiwan Intl	11715pa	
0800	0900	DRM UK, BBC World Service	9480eu	
0800	0900	UK, BBC World Service	6190af	7320eu
		9470eu	9740as	9860af
		15310as	15360as	15400af
		17760as	17790as	17830af
		21470af	21660as	17885af
0800	0900	Sat/Sun UK, BBC World Service	6195as	15575as
0800	0900	Ukraine, Radio Ukraine Intl	9945eu	
0800	0900	USA, American Forces Radio	4319usb	5446usb
		5765usb	6350usb	7811usb
		12133usb	13362usb	10320usb
0800	0900	USA, KAIJ Dallas TX	5755va	
0800	0900	USA, KNLS Anchor Point AK	7355as	
0800	0900	USA, KTNB Salt Lake City UT	7505na	
0800	0900	USA, KWHR Naalehu HI	9930as	
0800	0900	USA, WBOH Newport NC	5920am	
0800	0900	USA, WEWN Vandiver AL	5850na	7570eu
0800	0900	USA, WHRI Cypress Creek SC	7315am	
		7335am		
0800	0900	USA, WMLK Bethel PA	9265va	
0800	0900	USA, WRMI Miami FL	9955va	
0800	0900	USA, WTJC Newport NC	9370na	
0800	0900	USA, WWCN Nashville TN	3215na	5070na
		5890na	5935na	
0800	0900	USA, WWRB Manchester TN	3185va	
0800	0900	USA, WYFR/Family Radio FL	5985na	6855na
0800	0900	vi Vanuatu, Radio	4960do	
0800	0900	Zambia, CVC International	13650af	
0805	0900	mtwhf Guam, TWR/KTWR	15170as	
0815	0845	Sat UK, Bible Voice BC	9655eu	
0830	0900	Australia, ABC NT Katherine	2485do	
0830	0900	Australia, ABC NT Tennant Creek	2325do	
0830	0900	Lithuania, Radio Vilnius	9710eu	

0900 UTC - 5AM EDT / 4AM CDT / 2AM PDT

0900	0900	USA, WBCQ Monticello ME	5110am	7415na
0900	0927	Czech Rep, Radio Prague	9800eu	21745as
0900	0930	Australia, HCJB Global	11750pa	
0900	1000	Anguilla, University Network	6090am	
0900	1000	Australia, ABC NT Alice Springs	4835do	2310do
0900	1000	Australia, ABC NT Katherine	2485do	
0900	1000	Australia, ABC NT Tennant Creek	2325do	
0900	1000	Australia, CVC International	11955as	
0900	1000	Australia, Radio Australia	9580va	9590va
		11880as	15415as	
0900	1000	Bhutan, BBS	6035as	
0900	1000	Canada, CFRX Toronto ON	6070na	
0900	1000	Canada, CFVP Calgary AB	6030na	
0900	1000	Canada, CKZN St John's NF	6160na	
0900	1000	Canada, CKZU Vancouver BC	6160na	
0900	1000	China, China Radio Intl	11620as	15210pa
		15350as	17490eu	17750as
0900	1000	Costa Rica, University Network	5030va	
		6150va	7375va	9725va
				11870va
		13750va		
0900	1000	Germany, Deutsche Welle	15340as	17770as
0900	1000	vi Greece, Voice of	9420eu	15630eu
0900	1000	Guyana, Voice of	3291do	5950do
0900	1000	vi Liberia, ELWA	4760do	

0900	1000	Malaysia, RTM/Trax FM	7295as	
0900	1000	New Zealand, Radio NZ Intl	6095pa	
0900	1000	DRM New Zealand, Radio NZ Intl	7145pa	
0900	1000	Nigeria, Radio/Kaduna	4770do	6090al
0900	1000	Nigeria, Voice of/Ext. Svc Lagos	9690af	
0900	1000	Papua New Guinea, NBC	4890do	
0900	1000	vi Papua New Guinea, Wantok R. Light	7325va	
0900	1000	Saudi Arabia, BSKSA	15250af	
0900	1000	Singapore, MediaCorp Radio	6150do	
0900	1000	vi Solomon Islands, SIBC	5020do	9545al
0900	1000	South Africa, Channel Africa	9620af	
0900	1000	DRM UK, BBC World Service	9480eu	
0900	1000	UK, BBC World Service	9605as	
0900	1000	UK, BBC World Service	6190af	6195as
		7320eu	9470eu	9740eu
		11760me	15310as	15360as
		15575as	17760as	17830af
		21470af		
0900	1000	USA, American Forces Radio	4319usb	5446usb
		5765usb	6350usb	7811usb
		12133usb	13362usb	10320usb
0900	1000	USA, KAIJ Dallas TX	5755va	
0900	1000	USA, KTNB Salt Lake City UT	7505na	
0900	1000	USA, KWHR Naalehu HI	9930as	
0900	1000	USA, WBCQ Monticello ME	5110am	7415na
0900	1000	USA, WBOH Newport NC	5920am	
0900	1000	USA, WEWN Vandiver AL	5850na	
0900	1000	USA, WHRI Cypress Creek SC	7315am	
		7335am		
0900	1000	USA, WRMI Miami FL	9955va	
0900	1000	USA, WTJC Newport NC	9370na	
0900	1000	USA, WWCN Nashville TN	5070na	5890na
		5935na	9985na	
0900	1000	USA, WWRB Manchester TN	3185va	
0900	1000	USA, WYFR/Family Radio FL	5985na	6885na
		9450va	9755am	
0900	1000	vi Vanuatu, Radio	4960do	
0900	1000	Zambia, CVC International	13650af	
0930	0945	Israel, Kol Israel	13855eu	15760eu
0930	1000	Sun Italy, IRRS	9510eu	

1000 UTC - 6AM EDT / 5AM CDT / 3AM PDT

1000	1003	mtwhf Croatia, Croatian Radio	9830pa	
1000	1030	Mongolia, Voice of	12085va	
1000	1030	UK, BBC World Service	9605as	21660as
1000	1058	New Zealand, Radio NZ Intl	6095pa	
1000	1100	Anguilla, University Network	11775am	
1000	1100	Australia, ABC NT Alice Springs	4835do	2310do
1000	1100	Australia, ABC NT Katherine	2485do	
1000	1100	Australia, ABC NT Tennant Creek	2325do	
1000	1100	Australia, CVC International	11955as	
1000	1100	DRM Australia, CVC International	9760eu	
1000	1100	Australia, HCJB Global	15540va	
1000	1100	Australia, Radio Australia	9580va	9590va
		11880as	12080va	15415as
1000	1100	DRM Austria, CVC International	11815eu	
1000	1100	Canada, CFRX Toronto ON	6070na	
1000	1100	Canada, CFVP Calgary AB	6030na	
1000	1100	Canada, CKZN St John's NF	6160na	
1000	1100	Canada, CKZU Vancouver BC	6160na	
1000	1100	China, China Radio Intl	6040as	11610as
		11635as	13590as	13620as
		15190as	15210as	15350eu
		17690as		
1000	1100	Costa Rica, University Network	5030va	
		6150va	7375va	9725va
				11870va
		13750va		
1000	1100	Guyana, Voice of	3291do	5950do
1000	1100	India, All India Radio	7270as	13695va
		15020as	15260as	15410as
		17800as	17895pa	17510pa
1000	1100	Sun Italy, IRRS	9510eu	
1000	1100	Japan, Radio Japan/NHK World	6120na	
		9650va	9695as	11730as
		17585eu		11890pa
1000	1100	vi Liberia, ELWA	4760do	
1000	1100	Malaysia, RTM/Trax FM	7295as	
1000	1100	Netherlands, Radio	13710as	12065as
		13820as		
1000	1100	DRM New Zealand, Radio NZ Intl	7145pa	
1000	1100	Nigeria, Radio/Kaduna	4770do	6090al
1000	1100	Nigeria, Voice of/Ext. Svc Lagos	9690af	
1000	1100	North Korea, Voice of Korea	11710am	11735as
		13650as		
1000	1100	Papua New Guinea, NBC	4890do	
1000	1100	vi Papua New Guinea, Wantok R. Light	7325va	
1000	1100	Saudi Arabia, BSKSA	15250af	
1000	1100	Singapore, MediaCorp Radio	6150do	

1000	1100	vi	Solomon Islands, SIBC	5020do	9545al
1000	1100		South Africa, Channel Africa	9620af	
1000	1100		UK, BBC World Service	6190af	6195as
			7320eu	9470eu	9740as
			11760me	15310as	15575as
			17790as	17885af	21470af
1000	1100	Sat/Sun	UK, BBC World Service	15400af	
1000	1100		USA, American Forces Radio	4319usb	5446usb
			5765usb	6350usb	7811usb
			12133usb	13362usb	10320usb
1000	1100		USA, KAIJ Dallas TX	5755va	
1000	1100		USA, KNLS Anchor Point AK	6890as	7355al
1000	1100		USA, KTBN Salt Lake City UT	7505na	
1000	1100		USA, KWHR Naalehu HI	9930as	
1000	1100		USA, WBCQ Monticello ME	5110am	7415na
1000	1100		USA, WBOH Newport NC	5920am	
1000	1100		USA, WEWN Vandiver AL	5850na	
1000	1100		USA, WHRI Cypress Creek SC	7335am	7315am
1000	1100		USA, WRMI Miami FL	9955va	
1000	1100		USA, WTJC Newport NC	9370na	
1000	1100		USA, WWCN Nashville TN	5070na	5890na
			9985na	15825na	
1000	1100		USA, WWRB Manchester TN	3185va	
1000	1100		USA, WYFR/Family Radio FL	5950na	5985na
			6855na	7855am	9450va
1000	1100		Zambia, CVC International	13590af	
1015	1045	Sun	UK, Bible Voice BC	5910as	
1030	1057		Czech Rep, Radio Prague	9880eu	11665eu
1030	1058		Vietnam, Voice of 7285as		
1030	1100		Iran, Voice of the Islamic Rep	15600as	17660as
1030	1100		UK, BBC World Service	9605as	11945as
			15285as	15360as	21660as
1059	1100		New Zealand, Radio NZ Intl	9870pa	

1100 UTC - 7AM EDT / 6AM CDT / 4AM PDT

1100	1115	Sun	UK, Bible Voice BC	5945as	
1100	1128		Vietnam, Voice of 9840as	7220as	7285as
1100	1130		Australia, HCJB Global	15540va	
1100	1130		Iran, Voice of the Islamic Rep	15600as	17600as
1100	1145		USA, WYFR/Family Radio FL	9550am	9755am
1100	1158	DRM	New Zealand, Radio NZ Intl	7145pa	
1100	1200		Anguilla, University Network	11775am	
1100	1200		Australia, ABC NT Alice Springs	4835do	2310do
1100	1200		Australia, ABC NT Katherine	2485do	
1100	1200		Australia, ABC NT Tennant Creek		2325do
1100	1200		Australia, CVC International	13635as	
1100	1200	DRM	Australia, Radio Australia	12080va	
1100	1200		Australia, Radio Australia	5995va	6020va
			9475as	9560pa	9580va
			11880va		9590va
1100	1200	Sat/Sun	Canada, CBC NQ SW Service	9625na	
1100	1200		Canada, CFRX Toronto ON	6070na	
1100	1200		Canada, CFVP Calgary AB	6030na	
1100	1200		Canada, CKZN St John's NF	6160na	
1100	1200		Canada, CKZU Vancouver BC		6160na
1100	1200		China, China Radio Intl	5955as	6040na
			11650as	11750na	11795as
			13645as	13650eu	13720as
1100	1200		Costa Rica, University Network	5030va	
			6150va	7375va	9725va
			13750va		11870va
1100	1200	Sun	Italy, IRRS	9510eu	
1100	1200		Japan, Radio Japan/NHK World		6120na
			9695as	11730as	
1100	1200	vi	Liberia, ELWA	4760do	
1100	1200		Malaysia, RTM/Trax FM	7295as	
1100	1200		Netherlands, Radio	11675na	
1100	1200		New Zealand, Radio NZ Intl	9870pa	
1100	1200		Nigeria, Radio/Kaduna	4770do	6090al
1100	1200		Nigeria, Voice of/ Ext. Svc Lagos		9690af
1100	1200		Papua New Guinea, NBC	4890do	
1100	1200	vi	Papua New Guinea, Wantok R. Light		7325va
1100	1200		Saudi Arabia, BSKSA	15250af	
1100	1200		Singapore, Radio Singapore Intl		6080as
			6150as		
1100	1200		South Africa, Channel Africa	9620af	
1100	1200		Taiwan, Radio Taiwan Intl	11715as	
1100	1200	Sat/Sun	UK, BBC World Service	9660am	15400af
			15575as		
1100	1200		UK, BBC World Service	6190af	6195as
			7320eu	9465sa	9470eu
			9740as	9860va	11675va
			15310as	17760as	17790as
			21470af		17885af
1100	1200	mtwhf	UK, BBC World Service	15575as	17830af
1100	1200	Sat	UK, Bible Voice BC	5945as	
1100	1200		Ukraine, Radio Ukraine Intl	11550eu	

1100	1200		USA, American Forces Radio	4319usb	5446usb
			5765usb	6350usb	7811usb
			12133usb	13362usb	10320usb
1100	1200		USA, KAIJ Dallas TX	5755va	
1100	1200		USA, KTBN Salt Lake City UT	7505na	
1100	1200		USA, KWHR Naalehu HI	9930as	
1100	1200		USA, WBOH Newport NC	5920am	
1100	1200		USA, WEWN Vandiver AL	5850na	
1100	1200		USA, WINB Red Lion PA	9265am	
1100	1200		USA, WRMI Miami FL	9955va	
1100	1200		USA, WTJC Newport NC	9370na	
1100	1200		USA, WWCN Nashville TN	5070na	5890na
			9985na	15825na	
1100	1200		USA, WWRB Manchester TN	3185va	
1100	1200		USA, WYFR/Family Radio FL	5985na	7780am
			9625am		
1100	1200		Zambia, CVC International	13590af	
1115	1130	twhf	UK, Bible Voice BC	5945as	
1115	1200	m	UK, Bible Voice BC	5945as	
1130	1145		UK, BBC World Service	7135as	11920as
1130	1200		Australia, HCJB Global	15400va	
1130	1200	mtwhfa	Australia, HCJB Global	15425va	
1130	1200		Bulgaria, Radio	11700eu	
1130	1200		Guam, AWR/KSDA	15435as	
1130	1200	mtwhf	UK, BBC World Service	9660am	
1130	1200		Vatican City, Vatican Radio	15595va	17765va

1200 UTC - 8AM EDT / 7AM CDT / 5AM PDT

1200	1215	vi	UK, Bible Voice BC	5945as	
1200	1230	Sun	Australia, HCJB Global	15425va	
1200	1230		France, Radio France Intl	21620af	
1200	1230	DRM	UK, Bible Voice BC	5945eu	
1200	1245		USA, WYFR/Family Radio FL	5950na	5985na
1200	1256		Romania, Radio Romania Intl	11875eu	15220eu
1200	1258		New Zealand, Radio NZ Intl	9870pa	
1200	1259		Canada, Radio Canada Intl	9660as	15170as
1200	1300		Anguilla, University Network	11775am	
1200	1300		Australia, ABC NT Alice Springs	4835do	2310do
1200	1300		Australia, ABC NT Katherine	2485do	
1200	1300		Australia, ABC NT Tennant Creek		2325do
1200	1300		Australia, CVC International	13635as	
1200	1300		Australia, Radio Australia	5995va	6020va
			9475as	9560pa	9580va
			11880va		9590va
1200	1300	Sat/Sun	Canada, CBC NQ SW Service	9625na	
1200	1300		Canada, CFRX Toronto ON	6070na	
1200	1300		Canada, CFVP Calgary AB	6030na	
1200	1300		Canada, CKZN St John's NF	6160na	
1200	1300		Canada, CKZU Vancouver BC		6160na
1200	1300		China, China Radio Intl	5955as	9460as
			9730as	9760pa	11650as
			11690as	11760pa	11980as
			13650eu	13790eu	17490eu
1200	1300		Costa Rica, University Network		9725va
			11870va	13750va	
1200	1300	vi	Germany, AWR Europe	15435as	
1200	1300		Malaysia, RTM/Trax FM	7295as	
1200	1300	DRM	New Zealand, Radio NZ Intl	7145pa	
1200	1300		Nigeria, Radio/Kaduna	4770do	6090al
1200	1300		Nigeria, Voice of/ Ext. Svc Lagos		9690af
1200	1300		Papua New Guinea, NBC	4890do	
1200	1300	vi	Papua New Guinea, Wantok R. Light		7325va
1200	1300		Poland, Radio Polonia	9525eu	11850eu
1200	1300		Singapore, Radio Singapore Intl		6080as
			6150as		
1200	1300		South Korea, KBS World Radio		9650na
1200	1300		UAE, AWR Africa	15140as	
1200	1300		UK, BBC World Service	6190af	6195as
			7320eu	9465sa	9470eu
			9740as	9860af	11675va
			11760me	15310as	15575as
			17885af	21470af	17790af
1200	1300	mtwhf	UK, BBC World Service	17830af	
1200	1300		USA, American Forces Radio	4319usb	5446usb
			5765usb	6350usb	7811usb
			12133usb	13362usb	10320usb
1200	1300		USA, KAIJ Dallas TX	9480va	
1200	1300		USA, KNLS Anchor Point AK	9780as	9920al
1200	1300		USA, KTBN Salt Lake City UT	7505na	
1200	1300		USA, KWHR Naalehu HI	12130as	
1200	1300		USA, Voice of America	6140va	9645va
			9760va	11860as	12075va
1200	1300		USA, WBOH Newport NC	5920am	
1200	1300		USA, WEWN Vandiver AL	5850na	
1200	1300		USA, WHRA Greenbush ME	17650na	
1200	1300		USA, WHRI Cypress Creek SC		9495am
			17650am		
1200	1300		USA, WINB Red Lion PA	9265am	

1200	1300	USA, WRMI Miami FL	9955va	
1200	1300	USA, WTJC Newport NC	9370na	
1200	1300	USA, WWCR Nashville TN	5890na	9985na
		13845na 15825na		
1200	1300	USA, WWRB Manchester TN	3185va	
1200	1300	USA, WYFR/Family Radio FL	17555am 17750am	
1200	1300	Zambia, CVC International	13590af	
1205	1220	m Austria, Radio Austria Intl	6155va 13730va	
		17715va		
1205	1230	Sat/Sun Austria, Radio Austria Intl	6155va 13730va	
		17715va		
1215	1230	twhf Austria, Radio Austria Intl	17715va	
1215	1300	Egypt, Radio Cairo	17835as	
1230	1258	Vietnam, Voice of 9840as	12020as	
1230	1300	Bangladesh, Bangla Betar	7185as	
1230	1300	Sweden, Radio 13580va	15240na 15735va	
1230	1300	Thailand, Radio 9835va		
1230	1300	Turkey, Voice of 13685eu	15450eu	
1235	1300	Sat/Sun Austria, Radio Austria Intl	6155va 13730va	
		17715va		
1245	1300	Sat Australia, HCJB Global	15425va	
1245	1300	twhf Austria, Radio Austria Intl	6155va 13730va	
		17715va		
1245	1300	m Austria, Radio Austria Intl	17715va	

1300 UTC - 9AM EDT / 8AM CDT / 6AM PDT

1300	1327	Czech Rep, Radio Prague	13580eu 17540as	
1300	1328	Serbia, International Radio Serbia	7240eu	
1300	1330	twhf Albania, Radio Tirana	13750na	
1300	1330	Egypt, Radio Cairo	17835as	
1300	1330	Germany, Universal Life	15750as	
1300	1330	Sun Italy, IRRS	15750as	
1300	1330	Turkey, Voice of 13685eu	15450eu	
1300	1400	Anguilla, University Network	11775am	
1300	1400	Armenia, CVC International	15615as	
1300	1400	Australia, CVC International	13635as	
1300	1400	Australia, Radio Australia	6020va 9560as	
		9580va 9590va		
1300	1400	DRM Australia, Radio Australia	5995va	
1300	1400	Sat/Sun Canada, CBC NQ SW Service	9625na	
1300	1400	Canada, CFRX Toronto ON	6070na	
1300	1400	Canada, CFVP Calgary AB	6030na	
1300	1400	Canada, CKZN St John's NF	6160na	
1300	1400	Canada, CKZU Vancouver BC	6160na	
1300	1400	China, China Radio Intl	5955as 9570na	
		9650as 9730as 9760pa 9765as		
		9870as 11660as 11760pa 11980as		
		13610eu 13755as 13790eu 15260na		
		17625sa		
1300	1400	Costa Rica, University Network	9725va	
		11870va 13750va		
1300	1400	Germany, Overcomer Ministries	6110na	
1300	1400	vl/Sat Greece, Voice of 9420eu	15630eu	
1300	1400	Sun Latvia, Radio SWH	9290eu	
1300	1400	Malaysia, RTM/Trax FM	7295as	
1300	1400	New Zealand, Radio NZ Intl	6095pa	
1300	1400	Nigeria, Radio/Kaduna	4770do	
1300	1400	Nigeria, Voice of/ Ext. Svc Lagos	9690af	
1300	1400	North Korea, Voice of Korea	9335na 11710na	
		13650as 15180ca		
1300	1400	Papua New Guinea, NBC	4890do	
1300	1400	vl Papua New Guinea, Wantok R. Light	7325va	
1300	1400	Singapore, Radio Singapore Intl	6080as	
		6150as		
1300	1400	South Korea, KBS World Radio	9570na	
		9770as		
1300	1400	UK, BBC World Service	6190af 6195as	
		7320eu 9740as 9860af 11750as		
		11760me 15310as 15420af 17790as		
		17885af 21470af		
1300	1400	Sat/Sun UK, BBC World Service	15575as	
1300	1400	mtwhf UK, BBC World Service	17830af	
1300	1400	USA, American Forces Radio	4319usb 5446usb	
		5765usb 6350usb 7811usb 10320usb		
		12133usb 13362usb		
1300	1400	USA, KAJI Dallas TX	9480va	
1300	1400	USA, KJES Vado NM	11715na	
1300	1400	USA, KTVN Salt Lake City UT	7505na	
1300	1400	USA, KWHR Naalehu HI	12130as	
1300	1400	USA, Voice of America	9645va 9760va	
1300	1400	w f USA, WBCQ Monticello ME	9330am	
1300	1400	USA, WBOH Newport NC	5920am	
1300	1400	USA, WEWN Vandiver AL	5850na	
1300	1400	USA, WHRA Greenbush ME	17650na	
1300	1400	mtwhf USA, WHRI Cypress Creek SC	9495am	
1300	1400	USA, WHRI Cypress Creek SC	17650am	
1300	1400	USA, WINB Red Lion PA	13570am	
1300	1400	USA, WRMI Miami FL	9955va	
1300	1400	USA, WTJC Newport NC	9370na	

1300	1400	USA, WWCR Nashville TN	5890na 9985na	
		13845na 15825na		
1300	1400	USA, WWRB Manchester TN	9385na	
1300	1400	USA, WYFR/Family Radio FL	11830na 11865na	
		11895na 11910na	15670na 17750na	
1300	1400	Zambia, CVC International	13590af	
1330	1357	DRM/f-a Czech Rep, Radio Prague	9850eu	
1330	1400	DRM Canada, Radio Canada Intl	7240eu	
1330	1400	twhf Guam, AWR/KSDA	15275as	
1330	1400	India, All India Radio	9690as 11620as	
		13710as		
1330	1400	Laos, National Radio	7145as	
1330	1400	Sweden, Radio 15240na	15735va	
1330	1400	UK, BBC World Service	7465eu	
1345	1400	Guam, TWR/KTWR	9975as	

1400 UTC - 10AM EDT / 9AM CDT / 7AM PDT

1400	1415	t h Germany, Pan American BC	13645me	
1400	1415	twf Russia, FEBA	9500eu	
1400	1430	Australia, Radio Australia	5995va 6080va	
		9590va 9625va		
1400	1430	fa Guam, TWR/KTWR	9975as	
1400	1430	DRM Romania, Radio Romania Intl	9600eu	
1400	1430	Thailand, Radio 9805va		
1400	1430	tha UK, Sudan Radio Service	15470af	
1400	1500	Anguilla, University Network	11775am	
1400	1500	Armenia, CVC International	15615as	
1400	1500	Australia, CVC International	13635as	
1400	1500	Bhutan, BBS	6035as	
1400	1500	Sat/Sun Canada, CBC NQ SW Service	9625na	
1400	1500	Canada, CFRX Toronto ON	6070na	
1400	1500	Canada, CFVP Calgary AB	6030na	
1400	1500	Canada, CKZN St John's NF	6160na	
1400	1500	Canada, CKZU Vancouver BC	6160na	
1400	1500	China, China Radio Intl	5955as 9560as	
		9765as 9870eu 11675as 11765as		
		11775as 13610eu 13710eu 13740na		
		13790eu		
1400	1500	Costa Rica, University Network	9725va	
		11870va 13750va		
1400	1500	Sat Germany, Overcomer Ministries	17810eu	
1400	1500	Germany, Overcomer Ministries	6110eu	
		13810va		
1400	1500	mtw Guam, TWR/KTWR	9975as	
1400	1500	India, All India Radio	9690as 11620as	
		13710as		
1400	1500	Sun Italy, IRRS	6125eu	
1400	1500	Japan, Radio Japan/NHK World	7200as	
		11730as 11840pa		
1400	1500	Jordan, Radio 11690na		
1400	1500	Libya, Voice of Africa	17775af 17870af	
		21695af 21870af		
1400	1500	Malaysia, RTM/Trax FM	7295as	
1400	1500	Netherlands, Radio	9345as 9840as	
		11835as		
1400	1500	New Zealand, Radio NZ Intl	6095pa	
1400	1500	Nigeria, Radio/Kaduna	4770do	
1400	1500	Nigeria, Voice of/ Ext. Svc Lagos	9690af	
1400	1500	vl Papua New Guinea, Wantok R. Light	7325va	
1400	1500	Russia, Voice of 6045as	7165as 9745as	
		11755as 15695as 15660as		
1400	1500	DRM Russia, Voice of 9450eu		
1400	1500	Singapore, MediaCorp Radio	6150do	
1400	1500	South Africa, Channel Africa	9620af	
1400	1500	Taiwan, Radio Taiwan Intl	15265as	
1400	1500	Sat UK, BBC World Service	12095af	
1400	1500	mtwhf UK, BBC World Service	17830af	
1400	1500	UK, BBC World Service	3255af 6190af	
		6195as 7320eu 9740as 9860af		
		11750as 11920as 15310as 15575as		
		21470af 21660af		
1400	1500	Sat/Sun UK, Bible Voice BC	15680as	
1400	1500	Ukraine, Radio Ukraine Intl	7530eu	
1400	1500	USA, American Forces Radio	4319usb 5446usb	
		5765usb 6350usb 7811usb 10320usb		
		12133usb 13362usb		
1400	1500	USA, KAJI Dallas TX	9480va	
1400	1500	USA, KJES Vado NM	11715na	
1400	1500	USA, KNLS Anchor Point AK	7355as	
1400	1500	USA, KTVN Salt Lake City UT	7505na 15590na	
1400	1500	USA, KWHR Naalehu HI	9930as	
1400	1500	USA, Voice of America	4930af 6080af	
		7125va 9760va 13570af 15185va		
		15530va 17740va 17895va		
1400	1500	USA, WBCQ Monticello ME	9330am	
1400	1500	USA, WBOH Newport NC	5920am	
1400	1500	USA, WEWN Vandiver AL	9955na	
1400	1500	USA, WHRA Greenbush ME	17650na	
1400	1500	USA, WHRI Cypress Creek SC	9840am	

1400	1500		11785am	17650am	
1400	1500		USA, WINB Red Lion PA	13570am	
1400	1500		USA, WRMI Miami FL	7385na	
1400	1500		USA, WTJC Newport NC	9370na	
1400	1500		USA, WWCN Nashville TN	9985na	12160na
			13845na	15825na	
1400	1500		USA, WWRB Manchester TN	9385na	
1400	1500	Sat/Sun	USA, WYFR/Family Radio FL	15680as	
1400	1500		USA, WYFR/Family Radio FL	7320va	9865eu
			11830na	11910na	12150eu
			17750am		13695am
1400	1500		Zambia, CVC International	13590af	
1415	1430		Nepal, Radio	3230as	5005as
			7165as		6100as
1415	1445	m	UAE, FEBA	12025eu	
1430	1445	Sun	Germany, Pan American BC	13645as	13820as
1430	1445	twf	UAE, FEBA	12025eu	
1430	1500		Australia, Radio Australia	5995va	6080va
			9475as	9590va	9625va
1430	1500		Ethiopia, Radio	5990af	7110af
1430	1500		Myanmar, Radio	5986as	
1430	1500	DRM	South Korea, KBS World Radio		9770eu

1500 UTC - 11AM EDT / 10AM CDT / 8AM PDT

1500	1510	mtwhfa	Turkmenistan, Turkmen Radio	5015eu	
1500	1528		Vietnam, Voice of 9550va	9840va	12020va
			13860va		
1500	1530	vl	Eritrea, Bana Radio	5100do	
1500	1530		Guam, AWR/KSDA	11640as	
1500	1530		Nigeria, Radio, Natl Svc/Abuja		7275do
1500	1530		UK, BBC World Service	9695af	11860af
			15420af		
1500	1530	ta	UK, Bible Voice BC	13840as	
1500	1545		Sweden, IBRA Radio	7340as	
1500	1545		USA, WYFR/Family Radio FL	15770am	
1500	1550		New Zealand, Radio NZ Intl	6095pa	
1500	1555		South Africa, Channel Africa	17770af	
1500	1557		Canada, Radio Canada Intl	11675as	17720as
1500	1559		Germany, Overcomer Ministries		17815na
1500	1559		Libya, Voice of Africa	17775af	17870af
			21695af	21870af	
1500	1559		South Africa, Channel Africa	9620af	
1500	1600		Anguilla, University Network	11775am	
1500	1600		Armenia, CVC International	15615as	
1500	1600		Australia, CVC International	13635as	
1500	1600		Australia, Radio Australia	5995va	6080va
			9475as	9590va	9625va
1500	1600	Sat/Sun	Canada, CBC NQ SW Service	9625na	11660pa
1500	1600		Canada, CFRX Toronto ON	6070na	
1500	1600		Canada, CFVP Calgary AB	6030na	
1500	1600		Canada, CKZN St John's NF	6160na	
1500	1600		Canada, CKZU Vancouver BC		6160na
1500	1600		China, China Radio Intl	5955as	6100as
			7160as	7325eu	9785as
			11775as	11965eu	13640eu
			13740na	17630af	13685af
1500	1600		Costa Rica, University Network		9725va
			11870va	13750va	
1500	1600		Germany, CVC Intl/Voice Africa		15715af
1500	1600		Japan, Radio Japan/NHK World	6190as	
			7200as	9505va	9525na
1500	1600		Jordan, Radio	11690na	
1500	1600		Malaysia, RTM/Trax FM	7295as	
1500	1600		Netherlands, Radio	9345as	9890as
			11835as		
1500	1600		Nigeria, Radio/Kaduna	4770do	6090af
1500	1600		Nigeria, Voice of/ Ext. Svc Lagos		9690af
1500	1600		North Korea, Voice of Korea	9335na	11710na
			13760eu	15245eu	
1500	1600	vl	Papua New Guinea, Wantok R. Light		7325va
1500	1600		Russia, Voice of	4965me	4975me
			9625as	9660as	11985me
1500	1600		Singapore, MediaCorp Radio	6150do	12040eu
1500	1600		UAE, AWR Africa	11670as	
1500	1600	Sat	UK, BBC World Service	12095af	
1500	1600	mtwhf	UK, BBC World Service	17830af	
1500	1600		UK, BBC World Service	3255af	5975as
			6190af	6195as	7320af
			9860af	11750as	9740as
			15310as	15400af	11920as
			21660af		21470af
1500	1600		USA, American Forces Radio	4319usb	5446usb
			5765usb	6350usb	7811usb
			12133usb	13362usb	10320usb
1500	1600		USA, KAIJ Dallas TX		9480va
1500	1600		USA, KTBN Salt Lake City UT	7505na	15590na
1500	1600		USA, KWHR Naalehu HI	9930as	
1500	1600		USA, Voice of America	4930af	6080af
			7125va	9590va	9760va

			13735va	15105va	15445va	15580va
			17895af			
1500	1600		USA, WBCQ Monticello ME		9330am	
1500	1600		USA, WBOH Newport NC		5920am	
1500	1600		USA, WEWN Vandiver AL		9955na	
1500	1600		USA, WHRA Greenbush ME		17650na	
1500	1600		USA, WHRI Cypress Creek SC			9840am
			11785am			
1500	1600	Sun	USA, WHRI Cypress Creek SC			15355am
1500	1600	mtwhfa	USA, WHRI Cypress Creek SC			17650am
1500	1600		USA, WINB Red Lion PA		13570am	
1500	1600		USA, WRMI Miami FL		7385na	
1500	1600		USA, WTJC Newport NC		9370na	
1500	1600		USA, WWCN Nashville TN		9985na	12160na
			13845na	15825na		
1500	1600		USA, WWRB Manchester TN		9385na	
1500	1600		USA, WYFR/Family Radio FL		7320va	11830na
			11910na	15750na	17750am	
1500	1600		Zambia, CVC International		15715af	
1505	1520	m	Austria, Radio Austria Intl		13775ca	
1505	1530	Sat/Sun	Austria, Radio Austria Intl		13775ca	
1505	1600	DRM	Canada, Radio Canada Intl		9800na	
1505	1600		Canada, Radio Canada Intl		9515na	
1510	1545		Swaziland, TWR	4760af		
1515	1530	twhf	Austria, Radio Austria Intl		13775ca	
1515	1600	Sat	UK, Bible Voice BC		15680as	
1515	1600	ha	USA, WYFR/Family Radio FL		15680as	
1515	1600	Wed/ vl	USA, WYFR/Family Radio FL		15680as	
1530	1545		India, All India Radio		7255as	9910as
1530	1550		Vatican City, Vatican Radio		12065va	13765va
			15235va			
1530	1600	vl	Germany, AWR Europe		15225as	
1530	1600		Iran, Voice of the Islamic Rep		7370as	9635as
1530	1600	Sun	UK, Bible Voice BC		13590me	
1530	1600	m	UK, Bible Voice BC		15680as	
1530	1600	Sun	USA, WYFR/Family Radio FL		13590af	
1530	1600	Mon	USA, WYFR/Family Radio FL		15680as	
1535	1600	Sat/Sun	Austria, Radio Austria Intl		13775ca	
1540	1600	mtwhf	UK, Bible Voice BC		13590me	
1540	1600	mtwhf	USA, WYFR/Family Radio FL		13590af	
1545	1600	m	Austria, Radio Austria Intl		13775ca	
1545	1600	twhf	Austria, Radio Austria Intl		13775ca	
1545	1600	Sun	Germany, Pan American BC		13820me	
1545	1600	Sat	UK, Bible Voice BC		13590me	
1545	1600	Sat	USA, WYFR/Family Radio FL		13590af	
1551	1600		New Zealand, Radio NZ Intl		7145pa	
1551	1600	DRM	New Zealand, Radio NZ Intl		6095pa	

1600 UTC - 12PM EDT / 11AM CDT / 9AM PDT

1600	1605	DRM	Canada, Radio Canada Intl		9800na	
1600	1605	Sun	Croatia, Croatian Radio		6165eu	
1600	1615	mtwhfa	Croatia, Croatian Radio		6165eu	
1600	1615		Pakistan, Radio	9380va	11550af	11570va
1600	1615	twhf	UK, Bible Voice BC		13590me	
1600	1620	mtwh	Moldova, Radio DMR Pridnestrovye		5965eu	
1600	1627		Czech Rep, Radio Prague		5930eu	17485af
1600	1630	vl	Eritrea, Bana Radio		5100do	
1600	1630	h	Germany, Pan American BC		13820me	
1600	1630		Guam, AWR/KSDA		11640as	11805as
1600	1630		Iran, Voice of the Islamic Rep		7370as	7330as
1600	1630		Myanmar, Radio	9730do		
1600	1630		Nigeria, Voice of/ Ext. Svc Lagos			9690af
1600	1630	Sat/Sun	Swaziland, TWR	4760af		
1600	1630		UK, Bible Voice BC		13590me	
1600	1640	f	Moldova, Radio DMR Pridnestrovye		5965eu	
1600	1645	mtwhf	USA, WYFR/Family Radio FL		13590af	
1600	1645		USA, WYFR/Family Radio FL		11830na	11865na
			17750am			
1600	1700		Anguilla, University Network		11775am	
1600	1700		Australia, CVC International		13635as	
1600	1700		Australia, Radio Australia		5995va	6080va
			9475as	9710va	11660pa	
1600	1700	Sat	Canada, CBC NQ SW Service		9625na	
1600	1700		Canada, CFRX Toronto ON		6070na	
1600	1700		Canada, CFVP Calgary AB		6030na	
1600	1700		Canada, CKZN St John's NF		6160na	
1600	1700		Canada, CKZU Vancouver BC			6160na
1600	1700		Canada, Radio Canada Intl		9515na	
1600	1700		China, China Radio Intl		6100af	9570af
			11900eu	11940eu	11965eu	13760eu
1600	1700		Costa Rica, University Network			11870va
			13750va			
1600	1700		Egypt, Radio Cairo		11740af	
1600	1700		Ethiopia, Radio	7165af	9560af	
1600	1700		France, Radio France Intl		15160af	15605af
			17605af			
1600	1700		Germany, CVC Intl/Voice Africa			15715af
1600	1700		Germany, Deutsche Welle		6170as	9485as
			15640as			

1600	1700	Sun	Germany, Overcomer Ministries	17815na
1600	1700		Germany, Universal Life	7285va
1600	1700	fs	Italy, IRRS	7285eu
1600	1700		Jordan, Radio	11690na
1600	1700		Malaysia, RTM/Trax FM	7295as
1600	1700	DRM	New Zealand, Radio NZ Intl	6095pa
1600	1700		New Zealand, Radio NZ Intl	7145pa
1600	1700		Nigeria, Radio/Kaduna	4770do
1600	1700		North Korea, Voice of Korea	9990va
1600	1700	vi	Papua New Guinea, Wantok R. Light	7325va
1600	1700		Russia, Voice of	6070as
			9405as	9890eu
			12115va	11985va
1600	1700	vi	Rwanda, Radio	6055do
1600	1700		South Korea, KBS World Radio	9515eu
1600	1700		Taiwan, Radio Taiwan Intl	11550as
1600	1700		UK, BBC World Service	3915af
			6190af	6195as
			11760as	11920as
			17840af	21470af
1600	1700	DRM	UK, BBC World Service	7465eu
1600	1700	mtwhf	UK, BBC World Service	17830af
1600	1700	Sat/Sun	UK, BBC World Service	9695af
			12095af	11860af
1600	1700	Sun	UK, Bible Voice BC	13590me
1600	1700		USA, American Forces Radio	4319usb
			5765usb	6350usb
			12133usb	13362usb
1600	1700		USA, KAIJ Dallas TX	9480va
1600	1700		USA, KJES Vado NM	11715na
1600	1700		USA, KTNB Salt Lake City UT	15590na
1600	1700		USA, KWHR Naalehu HI	9930as
1600	1700		USA, Voice of America	4930af
			12080va	13600va
1600	1700		USA, WBCQ Monticello ME	9330am
1600	1700		USA, WBOH Newport NC	5920am
1600	1700		USA, WEWN Vandiver AL	9450na
1600	1700		USA, WHRA Greenbush ME	17640na
1600	1700		USA, WHRI Cypress Creek SC	9840am
			11960am	17640am
1600	1700		USA, WINB Red Lion PA	13570am
1600	1700	smtwhf	USA, WMLK Bethel PA	9265va
1600	1700		USA, WRMI Miami FL	9955va
1600	1700		USA, WTJC Newport NC	9370na
1600	1700		USA, WWCN Nashville TN	9985na
			13845na	15825na
1600	1700		USA, WWRB Manchester TN	9385na
1600	1700	Sun	USA, WYFR/Family Radio FL	13590af
1600	1700		USA, WYFR/Family Radio FL	6085am
			13695na	15650af
			21455va	21525af
1600	1700		Zambia, CVC International	15715af
1615	1630		Vatican City, Vatican Radio	4005va
			9645va	15595va
1615	1645	mtwhf	Swaziland, TWR	6130af
1615	1700		UK, Bible Voice BC	13590me
1630	1645		UK, Bible Voice BC	13590me
1630	1657		Slovakia, Radio Slovakia Int	5920eu
1630	1700		Guam, AWR/KSDA	6155as
1630	1700		Nigeria, Voice of/ Ext. Svc Lagos	15120af
1630	1700	Sat/Sun	Swaziland, TWR	6130af
1630	1700	Sun	UK, Bible Voice BC	13590me
1640	1650	mtwhfa	Turkmenistan, Turkmen Radio	4930eu
1645	1700	f	Sweden, IBRA Radio	9830as
1645	1700		Tajikistan, Tajik Radio	7245as
1645	1700	t/ vi	USA, WYFR/Family Radio FL	13590af

1700 UTC - 1PM EDT / 12PM CDT / 10AM PDT

1700	1704		Canada, Radio Canada Intl	9515na
1700	1715		Swaziland, TWR	3200af
1700	1715	vi	UK, Bible Voice BC	13590me
1700	1715	t/ vi	USA, WYFR/Family Radio FL	13590af
1700	1725		Vietnam, Voice of	7280va
			11630va	13860va
1700	1727		Czech Rep, Radio Prague	5930eu
1700	1730		Jordan, Radio	11690na
1700	1730	Sun	UK, Bible Voice BC	13590me
1700	1730		UK, Bible Voice BC	13590me
1700	1730	Sat/Sun	USA, Voice of America	4930af
1700	1730		USA, Voice of America	6080af
1700	1730	Sun	USA, WYFR/Family Radio FL	13590af
1700	1745		UK, BBC World Service	9630af
1700	1755		South Africa, Channel Africa	15235af
1700	1756		Romania, Radio Romania Intl	9535eu
1700	1800		Anguilla, University Network	11775am
1700	1800		Australia, CVC International	13635as
1700	1800		Australia, Radio Australia	5995va
			9475as	9580va
			9710as	11880va
1700	1800	Sat	Canada, CBC NQ SW Service	9625na

1700	1800		Canada, CFRX Toronto ON	6070na
1700	1800		Canada, CFVP Calgary AB	6030na
1700	1800		Canada, CKZN St John's NF	6160na
1700	1800		Canada, CKZU Vancouver BC	6160na
1700	1800		China, China Radio Intl	6100af
			9695eu	11900af
			11940eu	13760eu
1700	1800		Costa Rica, University Network	11870va
			13750va	
1700	1800		Egypt, Radio Cairo	11740af
1700	1800		Eqt. Guinea, Radio Africa	15190af
1700	1800		Germany, CVC Intl/Voice Africa	15715af
1700	1800		Germany, Universal Life	7285va
1700	1800	fs	Italy, IRRS	7285eu
1700	1800		Japan, Radio Japan/NHK World	9535va
			11970eu	15355af
1700	1800		Malaysia, RTM/Trax FM	7295as
1700	1800		New Zealand, Radio NZ Intl	7145pa
1700	1800	DRM	New Zealand, Radio NZ Intl	6095pa
1700	1800		Nigeria, Radio/Kaduna	4770do
1700	1800		Nigeria, Voice of/ Ext. Svc Lagos	15120af
1700	1800	vi	Papua New Guinea, Wantok R. Light	7325va
1700	1800		Poland, Radio Polonia	7140eu
1700	1800		Russia, Voice of	7350as
			11510af	11985af
1700	1800	Sat/Sun	Russia, Voice of	9820eu
1700	1800	vi	Rwanda, Radio	6055do
1700	1800		Taiwan, Radio Taiwan Intl	15690af
1700	1800	mtwhf	UK, BBC World Service	17830af
1700	1800	DRM	UK, BBC World Service	1296eu
			3915as	5975as
			6190af	6195eu
			9410va	9510as
			15400af	15485af
1700	1800	Sat	UK, Bible Voice BC	9430me
1700	1800		USA, American Forces Radio	4319usb
			5765usb	6350usb
			12133usb	13362usb
1700	1800		USA, KAIJ Dallas TX	9480va
1700	1800		USA, KTNB Salt Lake City UT	15590na
1700	1800		USA, KWHR Naalehu HI	9930as
1700	1800		USA, WBCQ Monticello ME	9330am
1700	1800		USA, WBOH Newport NC	5920am
1700	1800		USA, WEWN Vandiver AL	9450na
1700	1800		USA, WHRA Greenbush ME	15705na
1700	1800		USA, WHRI Cypress Creek SC	9840am
			11960am	15705am
1700	1800		USA, WINB Red Lion PA	13570am
1700	1800	smtwhf	USA, WMLK Bethel PA	9265va
1700	1800		USA, WRMI Miami FL	9955va
1700	1800		USA, WTJC Newport NC	9370na
1700	1800		USA, WWCN Nashville TN	9985na
			13845na	15825na
1700	1800		USA, WWRB Manchester TN	9385na
			15250va	
1700	1800	Sat/ vi	USA, WYFR/Family Radio FL	13590af
1700	1800		USA, WYFR/Family Radio FL	9890af
			13690na	15650af
			21455va	17795am
1700	1800		Zambia, CVC International	15715af
1700	1750		North Korea, Voice of Korea	9335na
			12014na	15245na
1705	1800	DRM	Canada, Radio Canada Intl	9800na
1730	1745		Israel, Kol Israel	9345eu
1730	1800		Bulgaria, Radio	5900eu
1730	1800		Guam, AWR/KSDA	9980me
1730	1800	vi	Liberia, ELWA	4760do
1730	1800		Swaziland, TWR	9500af
1730	1800	DRM	Sweden, Radio	5955eu
1730	1800		Sweden, Radio	6065va
1730	1800		UK, Bible Voice BC	9430me
1730	1800	Sat/Sun	USA, Voice of America	4930af
1730	1800		USA, Voice of America	6080af
			15580af	
1730	1800	mtwhf	USA, Voice of America	4930af
			15775af	13755af
1730	1800		Vatican City, Vatican Radio	11625af
			15570af	13765af
1745	1800		Bangladesh, Bangla Betar	7185as
1745	1800		India, All India Radio	7410eu
			9950eu	11620eu
			15075af	15155af

1800 UTC - 2PM EDT / 1PM CDT / 11AM PDT

1800	1815	Sat	UK, Bible Voice BC	11875as
1800	1828		Vietnam, Voice of	5955eu
1800	1830	w	Austria, AWR Europe	15315af
1800	1830	f	Italy, IRRS	7285eu
1800	1830		Nigeria, Radio, Natl Svc/Abuja	7275do
1800	1830		South Africa, AWR Africa	3215af

1800	1830		9610af		
1800	1830	Sun	UK, BBC World Service	5975as	11955as
1800	1830		UK, Bible Voice BC	6060eu	
1800	1830		UK, Bible Voice BC	13590me	
1800	1830	Sat/Sun	USA, Voice of America	4930af	
1800	1830		USA, Voice of America	6080af	15410af
			15580af	17895af	
1800	1830	Sat/ vl	USA, WYFR/Family Radio FL	13590af	
1800	1845	Sat	UK, Bible Voice BC	6060eu	
1800	1845		USA, WYFR/Family Radio FL	17535af	
1800	1850		New Zealand, Radio NZ Intl	7145pa	
1800	1850	DRM	New Zealand, Radio NZ Intl	9870pa	
1800	1900		Anguilla, University Network	11775am	
1800	1900	mtwhf	Argentina, RAE	9690eu	15345eu
1800	1900		Australia, Radio Australia	6080va	9475as
			9580va	9710va	11880va
1800	1900		Bangladesh, Bangla Betar	7185eu	
1800	1900		Canada, CFRX Toronto ON	6070na	
1800	1900		Canada, CFVP Calgary AB	6030na	
1800	1900		Canada, CKZN St John's NF	6160na	
1800	1900		Canada, CKZU Vancouver BC		6160na
1800	1900		Canada, Radio Canada Intl	9530af	11765af
			15235af	17810af	
1800	1900	DRM	Canada, Radio Canada Intl	9800na	
1800	1900		China, China Radio Intl	9600eu	11940eu
			13760eu		
1800	1900		Costa Rica, University Network		11870va
			13750va		
1800	1900		Eqt. Guinea, Radio Africa	15190af	
1800	1900		Germany, CVC Intl/Voice Africa		13820af
1800	1900		Germany, Universal Life	7285va	
1800	1900		India, All India Radio	7410eu	9445af
			9950eu	11620eu	11935af
			15075af	15155af	17670af
			7285eu		
1800	1900	Sun	Italy, IRRS		
1800	1900		Kuwait, Radio Kuwait	11990na	
1800	1900	vl	Liberia, ELWA	4760do	
1800	1900		Malaysia, RTM/Trax FM	7295as	
1800	1900		Netherlands, Radio	6020af	7125af
			11655af		
1800	1900		Nigeria, Radio/Kaduna	4770do	6090al
1800	1900		Nigeria, Voice of/ Ext. Svc Lagos		15120af
1800	1900		North Korea, Voice of Korea	13760eu	15245eu
1800	1900	vl	Papua New Guinea, Wantok R. Light	7325va	
1800	1900		Russia, Voice of	7370eu	9745af
			9890eu	11510af	11630eu
1800	1900	vl	Rwanda, Radio	6055do	
1800	1900		South Korea, KBS World Radio		7275eu
1800	1900		Swaziland, TWR	3200af	9500af
1800	1900		Taiwan, Radio Taiwan Intl	3965eu	
1800	1900	DRM	UK, BBC World Service	7420eu	
1800	1900		UK, BBC World Service	5975as	5995as
			6190af	6195eu	7380af
			12095eu	15400af	17795af
1800	1900	mtwhf	UK, BBC World Service	17830af	21470af
1800	1900	Sat/Sun	UK, Bible Voice BC	9430me	
1800	1900		USA, American Forces Radio	4319usb	5446usb
			5765usb	6350usb	7811usb
			12133usb	13362usb	10320usb
1800	1900		USA, KAIJ Dallas TX	9480va	
1800	1900		USA, KJES Vado NM	15385na	
1800	1900		USA, KTNB Salt Lake City UT	15590na	
1800	1900	smtwhf	USA, WBCQ Monticello ME	7415am	
1800	1900		USA, WBCQ Monticello ME	9330am	17495am
1800	1900		USA, WBOH Newport NC	5920am	
1800	1900		USA, WEWN Vandiver AL	9450na	15390eu
1800	1900		USA, WHRA Greenbush ME	15705na	
1800	1900		USA, WHRI Cypress Creek SC		9840am
			11960am	15705am	
1800	1900		USA, WINB Red Lion PA	13570am	
1800	1900	smtwhf	USA, WMLK Bethel PA	9265va	17495va
1800	1900		USA, WRMI Miami FL	9955va	
1800	1900		USA, WTJC Newport NC	9370na	
1800	1900		USA, WWCN Nashville TN	9975na	12160na
			13845na	15825na	
1800	1900		USA, WWRB Manchester TN	9385va	12180na
			15250va		
1800	1900		USA, WYFR/Family Radio FL	9845af	9860af
			13630af	13690af	13730af
			15650af	15750va	17795va
1800	1900		Yemen, Rep of Yemen Radio	9780me	
1805	1900	Sat	Zambia, CVC International	5940af	
1805	1815	mtwhf	Croatia, Croatian Radio	6165eu	
1830	1857		Croatia, Croatian Radio	6165eu	
1830	1858		Slovakia, Radio Slovakia Int	5920eu	6055eu
1830	1900		Serbia, International Radio Serbia		7240eu
1830	1900		Turkey, Voice of	9785eu	
1830	1900		UK, BBC World Service	6005af	9485as
			9630af		
1830	1900	f	UK, Bible Voice BC	9430me	
1830	1900		USA, Voice of America	4930af	6080af

			15410af	15580af	17895af
1845	1900	mtwhf	Albania, Radio Tirana	6035eu	7465eu
1845	1900		Congo, RTV Congolaise	4765af	5985af
1845	1900	Sun	UK, Bible Voice BC	9775af	
1851	1900	DRM	New Zealand, Radio NZ Intl	9890pa	
1851	1900		New Zealand, Radio NZ Intl	9615pa	
1900 UTC - 3PM EDT / 2PM CDT / 12PM PDT					
1900	1903		Bahrain, Radio Bahrain	6010as	
1900	1905	DRM	Canada, Radio Canada Intl	9800na	
1900	1915		Congo, RTV Congolaise	4765af	5985af
1900	1928		Vietnam, Voice of 7280va	9730va	
1900	1930		Germany, Deutsche Welle	9895af	11795as
			17820af		
1900	1930		Turkey, Voice of	9785eu	
1900	1930	Sat	UK, Bible Voice BC	9775af	
1900	1930		UK, Bible Voice BC	6060eu	
1900	1945		India, All India Radio	7410eu	9445af
			9950eu	11620eu	11935af
			15075af	15155af	17670af
1900	1945		USA, WYFR/Family Radio FL	6085am	
1900	1957	Sat/Sun	Netherlands, Radio	15315na	17660va
			17735af		
1900	2000		Anguilla, University Network	11775am	
1900	2000		Australia, Radio Australia	6080va	9500as
			9580va	9710va	11880as
1900	2000		Canada, CFRX Toronto ON	6070na	
1900	2000		Canada, CFVP Calgary AB	6030na	
1900	2000		Canada, CKZN St John's NF	6160na	
1900	2000		Canada, CKZU Vancouver BC		6160na
1900	2000		China, China Radio Intl	7295va	9435va
			9440va	11940eu	
1900	2000		Costa Rica, University Network		11870va
			13750va		
1900	2000		Egypt, Radio Cairo	15375af	
1900	2000		Eqt Guinea, Radio Africa	15190af	
1900	2000		Germany, CVC Intl/Voice Africa		13820af
1900	2000	vl	Liberia, ELWA	4760do	
1900	2000		Malaysia, RTM/Trax FM	7295as	
1900	2000		Netherlands, Radio	5905af	7115af
			11655af	17810af	
1900	2000		New Zealand, Radio NZ Intl	9615pa	
1900	2000	DRM	New Zealand, Radio NZ Intl	9890pa	
1900	2000		Nigeria, Radio/Kaduna	4770do	6090al
1900	2000		Nigeria, Voice of/ Ext. Svc Lagos		15120af
1900	2000		North Korea, Voice of Korea	7100af	9975va
			11535va	11910af	
1900	2000		Papua New Guinea, NBC	4890do	
1900	2000	vl	Papua New Guinea, Wantok R. Light		7325va
1900	2000		Russia, Voice of	7195eu	7310eu
			12070eu		
1900	2000	vl	Rwanda, Radio	6055do	
1900	2000	vl	Solomon Islands, SIBC		5020do
1900	2000		Swaziland, TWR	3200af	9545al
1900	2000		Uganda, Radio	4976do	5026do
1900	2000	vl	UK, BBC World Service	7420eu	
1900	2000	DRM	UK, BBC World Service	5995as	6005as
			6190af	9455af	9485af
			9630as	15400af	17795as
1900	2000	mtwhf	UK, BBC World Service	17830af	
1900	2000	Sun	UK, Bible Voice BC	9775af	
1900	2000		Ukraine, Radio Ukraine Intl	7490eu	
1900	2000		USA, American Forces Radio	4319usb	5446usb
			5765usb	6350usb	7811usb
			12133usb	13362usb	10320usb
1900	2000		USA, KAIJ Dallas TX	9480va	
1900	2000		USA, KJES Vado NM	15385na	
1900	2000		USA, KTNB Salt Lake City UT	15590na	
1900	2000		USA, Voice of America	4930af	4940af
			6080af	7480va	9670va
			15445af	15580af	17895af
1900	2000		USA, WBCQ Monticello ME	7415am	9330am
			17495am		
1900	2000		USA, WBOH Newport NC	5920am	
1900	2000		USA, WEWN Vandiver AL	9450na	15390eu
1900	2000		USA, WHRA Greenbush ME	13710na	
1900	2000		USA, WHRI Cypress Creek SC		9840am
			13710am	17650am	
1900	2000		USA, WINB Red Lion PA	13570am	
1900	2000	smtwhf	USA, WMLK Bethel PA	9265va	17495va
1900	2000		USA, WRMI Miami FL	9955va	
1900	2000		USA, WTJC Newport NC	9370na	
1900	2000		USA, WWCN Nashville TN	9975na	12160na
			13845na	15825na	
1900	2000		USA, WWRB Manchester TN	9385va	12180na
			15250va		
1900	2000		USA, WYFR/Family Radio FL	7240va	9610af
			9860af	13690na	13800na
			17845af	18930eu	17795am

1900	2000		Zambia, CVC International	5940af	
1900	2000		Kuwait, Radio Kuwait	11990na	
1930	2000	Sat/Sun	Germany, Pan American BC	5850me	
1930	2000		Iran, Voice of the Islamic Rep	6205eu	6255eu
			7205af	9800af	
1930	2000		Lithuania, Radio Vilnius	6255eu	
1930	2000		Sweden, Radio	6065va	
1945	2000	DRM	Vatican City, Vatican Radio	9800na	
1950	2000		Vatican City, Vatican Radio	4005eu	5885eu
			9645eu		

2000 UTC - 4PM EDT / 3PM CDT / 1PM PDT

2000	2015	Sun	Germany, Pan American BC	5850me	
2000	2020		Vatican City, Vatican Radio	4005af	5885af
			9645af		
2000	2027		Czech Rep, Radio Prague	5930eu	11600va
2000	2027		Lithuania, Radio Vilnius	6255eu	
2000	2030	twthfas	Albania, Radio Tirana	7465eu	13720va
2000	2030		Egypt, Radio Cairo	15375af	
2000	2030		Germany, AWR Europe	15235as	
2000	2030	f	Germany, Pan American BC	5850me	
2000	2030		Iran, Voice of the Islamic Rep	6205eu	6255eu
			7205af	9800af	
2000	2030		Swaziland, TWR	3200af	
2000	2030		Turkey, Voice of	6195eu	
2000	2030		USA, Voice of America	4930af	4940af
			6080af	15455af	15580af
2000	2030		Vatican City, Vatican Radio	7365af	9755af
			11625af		
2000	2030	DRM	Vatican City, Vatican Radio	9800na	
2000	2045		USA, WYFR/Family Radio FL	17750eu	
2000	2050		New Zealand, Radio NZ Intl	9615pa	
2000	2050	DRM	New Zealand, Radio NZ Intl	9890pa	
2000	2057		Germany, Deutsche Welle	7130af	11795af
2000	2059		Canada, Radio Canada Intl	5850eu	7235eu
			15325eu		
2000	2100		Anguilla, University Network	11775am	
2000	2100		Australia, ABC NT Alice Springs		2310do
			4835do		
2000	2100		Australia, ABC NT Katherine	2485do	
2000	2100		Australia, ABC NT Tennant Creek		2325do
2000	2100		Australia, Radio Australia	9500as	11650pa
			11660pa	11880as	12080va
2000	2100	Sat/Sun	Australia, Radio Australia	6080va	
2000	2100		Canada, CFRX Toronto ON	6070na	
2000	2100		Canada, CFVP Calgary AB	6030na	
2000	2100		Canada, CKZN St John's NF	6160na	
2000	2100		Canada, CKZU Vancouver BC		6160na
2000	2100	DRM	Canada, Radio Canada Intl	9800na	
2000	2100		China, China Radio Intl	5960eu	7190eu
			7265eu	7295af	9440af
			9800eu	11640af	13630af
2000	2100		Costa Rica, University Network		13750va
2000	2100		Eqt Guinea, Radio Africa	15190af	
2000	2100		Germany, CVC Intl/Voice Africa		13820af
2000	2100		Germany, Deutsche Welle	11865af	15205af
2000	2100		Indonesia, Voice of	9525eu	11785eu
			15150al		
2000	2100		Kuwait, Radio Kuwait	11990na	
2000	2100	vl	Liberia, ELWA	4760do	
2000	2100		Malaysia, RTM/Trax FM	7295as	
2000	2100		Netherlands, Radio	5905af	7115af
			17810af		
2000	2100	Sat/Sun	Netherlands, Radio	15315na	17660va
			17735na		
2000	2100		Nigeria, Radio/Kaduna	4770do	6090al
2000	2100		Nigeria, Voice of/ Ext. Svc Lagos		15120af
2000	2100		Papua New Guinea, NBC	4890do	
2000	2100	vl	Papua New Guinea, Wantok R. Light		7325va
2000	2100		Russia, Voice of	9890eu	12070eu
2000	2100	vl	Rwanda, Radio	6055do	
2000	2100	vl	Solomon Islands, SIBC	5020do	9545al
2000	2100		South Africa, Channel Africa	3345af	
2000	2100	mtwhf	Spain, Radio Exterior Espana	9665eu	11625af
2000	2100	vl	Uganda, Radio	4976do	5026do
2000	2100		UK, BBC World Service	6005af	6190af
2000	2100		9410af	9455af	9630af
			UK, BBC World Service	17830af	
2000	2100	DRM	UK, BBC World Service	5875eu	
			USA, American Forces Radio	4319usb	5446usb
			5765usb	6350usb	7811usb
			12133usb	13362usb	10320usb
2000	2100		USA, KAIJ Dallas TX	9480va	
2000	2100		USA, KJES Vado NM	15385na	
2000	2100		USA, KTNB Salt Lake City UT	15590na	
2000	2100		USA, WBCQ Monticello ME	7415am	9330am
			17495am		
2000	2100		USA, WBOH Newport NC	5920am	
2000	2100		USA, WEWN Vandiver AL	9450na	15220af
2000	2100	mtwhf	USA, WHRA Greenbush ME	7400na	
2000	2100	Sat/Sun	USA, WHRA Greenbush ME	11885na	

2000	2100		USA, WHRI Cypress Creek SC		17650am
2000	2100	Sat/Sun	USA, WHRI Cypress Creek SC		9840am
			11885am		
2000	2100	mtwhf	USA, WHRI Cypress Creek SC		7400am
			13670am		
2000	2100		USA, WINB Red Lion PA	13570am	
2000	2100	smtwhf	USA, WMLK Bethel PA	9265va	17495va
2000	2100		USA, WRMI Miami FL	9955va	
2000	2100		USA, WTJC Newport NC	9370na	
2000	2100		USA, WWCN Nashville TN	9975na	12160na
			13845na		
2000	2100		USA, WWRB Manchester TN	9385va	12180na
			15250va		
2000	2100		USA, WYFR/Family Radio FL	3230af	7430eu
			17725am	17845af	18980va
2000	2100		Zambia, CVC International	5940af	
2005	2100		Syria, Radio Damascus	9330eu	12085eu
2020	2100		Belarus, Radio	7105eu	7390eu
			7440al		
2030	2045		Thailand, Radio	9680eu	
2030	2056		Romania, Radio Romania Intl	9515va	11810va
			11940va	15465va	
2030	2058		Vietnam, Voice of	7280va	9550va
			13860va		9730va
2030	2100		Cuba, Radio Havana	9505va	11760va
2030	2100	DRM	Netherlands, Radio	9800na	
2030	2100		Turkey, Voice of	7170va	
2030	2100		USA, Voice of America	4930af	6080af
			7555as	15445af	15580af
2030	2100	Sat/Sun	USA, Voice of America	4940af	
2045	2100		India, All India Radio	7410eu	9445eu
			9910pa	11620va	11715pa
2051	2100		New Zealand, Radio NZ Intl	15720pa	

2100 UTC - 5PM EDT / 4PM CDT / 2PM PDT

2100	2130		Australia, ABC NT Katherine	2485do	
2100	2130		Australia, ABC NT Tennant Creek		2325do
2100	2130		Austria, AWR Europe	11955af	
2100	2130	Sat	Canada, CBC NQ SW Service	9625na	
2100	2130		China, China Radio Intl	5960eu	7190eu
			7285eu	9490eu	9600eu
			13630af		11640af
2100	2130		Cuba, Radio Havana	9505va	11760va
2100	2130		Nigeria, Radio, Natl Svc/Abuja		7275do
2100	2130		South Korea, KBS World Radio		3955eu
2100	2130		Turkey, Voice of	7170va	
2100	2145		USA, WYFR/Family Radio FL	13800na	17795am
			18980va		
2100	2150	DRM	New Zealand, Radio NZ Intl	11675pa	
2100	2159	smtwhf	Germany, Overcomer Ministries		7310eu
2100	2159	Sat/Sun	Spain, Radio Exterior Espana	9840eu	11625af
2100	2200		Anguilla, University Network	11775am	
2100	2200		Australia, ABC NT Alice Springs		2310do
			4835do		
2100	2200		Australia, Radio Australia	9500as	9660as
			11650pa	11660pa	11695as
			13630as	15515as	12080as
2100	2200		Bulgaria, Radio	5900eu	9700eu
2100	2200		Canada, CFRX Toronto ON	6070na	
2100	2200		Canada, CFVP Calgary AB	6030na	
2100	2200		Canada, CKZN St John's NF	6160na	
2100	2200		Canada, CKZU Vancouver BC		6160na
2100	2200	DRM	Canada, Radio Canada Intl	9800na	
2100	2200		Costa Rica, University Network		13750va
2100	2200		Eqt Guinea, Radio Africa	15190af	
2100	2200		Germany, Deutsche Welle	9735af	11865af
			15205af		
2100	2200		Guyana, Voice of	3291do	5950do
2100	2200		India, All India Radio	7410eu	9445eu
			9910pa	11620va	11715pa
2100	2200		Japan, Radio Japan/NHK World		6035va
			6055eu	6180eu	11855af
			17870pa		17825na
2100	2200	vl	Liberia, ELWA	4760do	
2100	2200		Malaysia, RTM/Trax FM	7295as	
2100	2200		New Zealand, Radio NZ Intl	15720pa	
2100	2200		Nigeria, Radio/Kaduna	4770do	6090al
2100	2200		Nigeria, Voice of/ Ext. Svc Lagos		7255af
2100	2200		North Korea, Voice of Korea	13760eu	15245eu
2100	2200		Papua New Guinea, NBC	4890do	
2100	2200	vl	Papua New Guinea, Wantok R. Light		7325va
2100	2200		South Africa, Channel Africa	3345af	
2100	2200		Syria, Radio Damascus	9330eu	12085eu
2100	2200		UK, BBC World Service	3915as	5975as
			6005af	6190af	6195af
			11945as	12095am	13640af
2100	2200	DRM	UK, BBC World Service	5875eu	
2100	2200		Ukraine, Radio Ukraine Intl	7510eu	
2100	2200		USA, American Forces Radio	4319usb	5446usb
			5765usb	6350usb	7811usb
					10320usb

2100	2200	12133usb	13362usb		
2100	2200	USA, KAIJ Dallas TX	9480va		
2100	2200	USA, KTBN Salt Lake City UT	15590na		
2100	2200	USA, Voice of America	6080af	15580af	
2100	2200	USA, WBCQ Monticello ME	7415am	9330am	
		17495am			
2100	2200	USA, WBOH Newport NC	5920am		
2100	2200	USA, WEWN Vandiver AL	9450na	15220af	
2100	2200	mtwhf USA, WHRA Greenbush ME	7400na		
2100	2200	Sat/Sun USA, WHRA Greenbush ME	11885na		
2100	2200	mtwhf USA, WHRI Cypress Creek SC		7400am	
		13670am			
2100	2200	Sat/Sun USA, WHRI Cypress Creek SC		11885am	
2100	2200	USA, WINB Red Lion PA	13570am		
2100	2200	mtwhfa USA, WRMI Miami FL	9955va		
2100	2200	Sun USA, WRMI Miami FL	7385na		
2100	2200	USA, WTJC Newport NC	9370na		
2100	2200	USA, WWCN Nashville TN	9975na	12160na	
		13845na			
2100	2200	USA, WWRB Manchester TN	9385va	12180na	
		15250va			
2100	2200	USA, WYFR/Family Radio FL	3230af	7430eu	
		9610af	11565eu	17795am	17845af
2115	2200	Egypt, Radio Cairo	9990eu		
2130	2157	Czech Rep, Radio Prague	9410af	11600na	
2130	2200	Australia, ABC NT Katherine	5025do		
2130	2200	Australia, ABC NT Tennant Creek		4910do	
2130	2200	mtwhfa Canada, CBC NQ SW Service	9625na		
2130	2200	Guam, AWR/KSDA	11850as		
2130	2200	Sweden, Radio	6065va	7420va	
2151	2200	DRM New Zealand, Radio NZ Intl	13730pa		

2200 UTC - 6PM EDT / 5PM CDT / 3PM PDT

2200	2210	Syria, Radio Damascus	9330eu	12085eu	
2200	2230	DRM Germany, Deutsche Welle	9800na		
2200	2230	India, All India Radio	7410eu	9445eu	
		9910pa	11620va	11715pa	
2200	2230	vi Liberia, ELWA	4760do		
2200	2230	Papua New Guinea, NBC	4890do		
2200	2245	Egypt, Radio Cairo	9990eu		
2200	2245	USA, WYFR/Family Radio FL	15770af		
2200	2256	Romania, Radio Romania Intl	7185va	9675va	
		9790va	11940va		
2200	2300	Anguilla, University Network	6090am		
2200	2300	Australia, ABC NT Alice Springs		2310do	
		4835do			
2200	2300	Australia, ABC NT Katherine	5025do		
2200	2300	Australia, ABC NT Tennant Creek		4910do	
2200	2300	Australia, Radio Australia	11840va	13630va	
		15230va	15240pa	15515as	17785va
2200	2300	smtwhf Canada, CBC NQ SW Service	9625na		
2200	2300	Canada, CFRX Toronto ON	6070na		
2200	2300	Canada, CFVP Calgary AB	6030na		
2200	2300	Canada, CKZN St John's NF	6160na		
2200	2300	Canada, CKZU Vancouver BC		6160na	
2200	2300	China, China Radio Intl	7175eu	9590as	
2200	2300	Costa Rica, University Network		13750va	
2200	2300	Eqt Guinea, Radio Africa	15190af		
2200	2300	Guyana, Voice of 3291do			
2200	2300	Malaysia, RTM/Trax FM	7295as		
2200	2300	DRM New Zealand, Radio NZ Intl	13730pa		
2200	2300	New Zealand, Radio NZ Intl	15720pa		
2200	2300	Nigeria, Radio/Kaduna	4770do	6090al	
2200	2300	Nigeria, Voice of/ Ext. Svc Lagos		7255af	
2200	2300	vi Papua New Guinea, Wantok R. Light		7325va	
2200	2300	vi Solomon Islands, SIBC	5020do	9545al	
2200	2300	Taiwan, Radio Taiwan Intl	15600eu		
2200	2300	Turkey, Voice of	6195va		
2200	2300	UK, BBC World Service	5955as	5965as	
		5975am	6195as	7105as	9740as
		12095af	13640am	15400af	
2200	2300	USA, American Forces Radio	4319usb	5446usb	
		5765usb	6350usb	7811usb	10320usb
		12133usb	13362usb		
2200	2300	USA, KAIJ Dallas TX	9480va		
2200	2300	USA, KTBN Salt Lake City UT	15590na		
2200	2300	USA, Voice of America	7120va	9415as	
		11725va	15185va		
2200	2300	mtwhf USA, WBCQ Monticello ME	5110am	17495am	
2200	2300	USA, WBCQ Monticello ME	7415am	9330na	
2200	2300	USA, WBOH Newport NC	5920am		
2200	2300	USA, WEWN Vandiver AL	9975na	15745eu	
2200	2300	USA, WHRA Greenbush ME	11885na		
2200	2300	mtwhfa USA, WHRI Cypress Creek SC		9515am	
2200	2300	USA, WHRI Cypress Creek SC		11885am	
2200	2300	USA, WINB Red Lion PA	13570am		
2200	2300	USA, WRMI Miami FL	9955va		
2200	2300	USA, WTJC Newport NC	9370na		
2200	2300	USA, WWCN Nashville TN	9975na	9985na	

2200	2300	12160na	13845na		
		USA, WWRB Manchester TN	6890va	9385va	
		12180na	15250va		
2200	2300	Sat/Sun USA, WWRB Manchester TN	3185na	15250va	
		15250va			
2200	2300	USA, WYFR/Family Radio FL	9620af	11740na	
2215	2230	Croatia, Croatian Radio	6165eu	9925eu	
2230	2257	Czech Rep, Radio Prague	7345na	9415na	
2230	2300	Guam, AWR/KSDA	15320as		
2230	2300	Papua New Guinea, NBC	9675do		
2230	2300	USA, Voice of America	9570va	11705va	
		15145va			
2245	2300	India, All India Radio	9705as	9950as	
		11620as	11645as	13605as	

2300 UTC - 7PM EDT / 6PM CDT / 4PM PDT

2300	0000	Anguilla, University Network	6090am		
2300	0000	Australia, ABC NT Alice Springs		2310do	
		4835do			
2300	0000	Australia, ABC NT Katherine	5025do		
2300	0000	Australia, ABC NT Tennant Creek		4910do	
2300	0000	smtwhf Canada, CBC NQ SW Service	9625na		
2300	0000	Canada, CFRX Toronto ON	6070na		
2300	0000	Canada, CFVP Calgary AB	6030na		
2300	0000	Canada, CKZN St John's NF	6160na		
2300	0000	Canada, CKZU Vancouver BC		6160na	
2300	0000	China, China Radio Intl	5915as	5990va	
		6145na	7180as	11685as	11840na
2300	0000	Costa Rica, University Network		13750va	
2300	0000	Cuba, Radio Havana	9550va		
2300	0000	Egypt, Radio Cairo	9460na		
2300	0000	Guyana, Voice of 3291do			
2300	0000	India, All India Radio	9705as	9950as	
		11620as	11645as	13605as	
2300	0000	Malaysia, RTM/Trax FM	7295as		
2300	0000	DRM New Zealand, Radio NZ Intl	13730pa		
2300	0000	New Zealand, Radio NZ Intl	15720pa		
2300	0000	Papua New Guinea, NBC	9675do		
2300	0000	vi Papua New Guinea, Wantok R. Light		7325va	
2300	0000	Singapore, MediaCorp Radio	6150do		
2300	0000	vi Solomon Islands, SIBC	5020do	9545al	
2300	0000	UK, BBC World Service	3915as	5965as	
		6195as	9740as	11945as	11955as
		12010as			
2300	0000	USA, American Forces Radio	4319usb	5446usb	
		5765usb	6350usb	7811usb	10320usb
		12133usb	13362usb		
2300	0000	USA, KAIJ Dallas TX	9480va		
2300	0000	USA, KTBN Salt Lake City UT	15590na		
2300	0000	USA, Voice of America	7120va	9415va	
		11725va	15185va		
2300	0000	USA, WBCQ Monticello ME	5110na	7415am	
		9330am	17495am		
2300	0000	USA, WBOH Newport NC	5920am		
2300	0000	USA, WEWN Vandiver AL	9975na	15745eu	
2300	0000	USA, WHRA Greenbush ME	7520na		
2300	0000	Sun USA, WHRI Cypress Creek SC		7490am	
2300	0000	USA, WHRI Cypress Creek SC		7315am	
		7520am			
2300	0000	mtwhfa USA, WHRI Cypress Creek SC		9515am	
2300	0000	Sun USA, WHRI Cypress Creek SC		7490am	
2300	0000	USA, WINB Red Lion PA	9265am		
2300	0000	USA, WRMI Miami FL	9955va		
2300	0000	USA, WTJC Newport NC	9370na		
2300	0000	USA, WWCN Nashville TN	5070na	7465na	
		9985na	13845na		
2300	0000	USA, WWRB Manchester TN	3185na	5050na	
		6890na	15250va		
2300	0000	USA, WYFR/Family Radio FL	15255am	17750am	
2300	2300	Bulgaria, Radio	9700na	11700na	
2300	2315	Nigeria, Radio/Kaduna	4770do	6090al	
2300	2330	Australia, Radio Australia	9660as	11840va	
		13690pa	15230pa	17785va	
		17795va			
2300	2330	USA, Voice of America	9570va	13755va	
		15145va			
2300	2345	USA, WYFR/Family Radio FL	11740na		
2300	2345	DRM Vatican City, Vatican Radio	7370na		
2305	0000	Canada, Radio Canada Intl	6100na		
2305	0000	Greece, Voice of	7475eu	15650eu	
2330	0000	Australia, Radio Australia	9660as	11840va	
		12080va	13690va	15230pa	15415va
		17750va	17785va	17795va	
2330	0000	Burma, Dem Voice of Burma	5955eu		
2330	0000	Lithuania, Radio Vilnius	9875na		
2330	0000	UK, BBC World Service	9580as		
2330	0000	USA, Voice of America	7350va	9570va	
		13755va	15145va		
2330	2358	Vietnam, Voice of	9840as	12020as	
2330	2359	DRM Sweden, Radio	9800na		

US Aerial Refueling Frequencies Changed

Over the past few years I have documented in this column and on my internet blog that major changes are being made to the 225-400 MHz milair bandplan here in the Continental United States (CONUS). These significant frequency changes are due in part to the conversion of most of the 380-400 MHz frequencies from 25 kHz spaced aero frequencies to 12.5 kHz spaced Land Mobile Radio (LMR) assignments. Other changes appear to involve new subbands devoted to wideband communications, air traffic control frequency blocks, new nationwide command and control frequencies, and other changes scattered through this portion of the UHF spectrum.

On July 5, 2007, the Department of Defense released a new edition of their *Flight Information Publication AP-1B*. There were quite a few frequency changes in aerial refueling section of this publication.

TABLE 1: AFFECTED AERIAL REFUELING ROUTES

Aerial Refueling Route	Type	Boomer Primary	Secondary
AR-1 (East)	Aerial Refueling Track	343.500	256.650
AR-2 (West)	Aerial Refueling Track	283.900	256.650
AR-3H (E/W)	Aerial Refueling Track	265.500	271.650
AR-3L	Aerial Refueling Track	235.100	256.650
AR-5H (E/W)	Aerial Refueling Track	283.900	342.550
AR-5L (E/W)	Aerial Refueling Track	256.650	278.750
AR-6	Aerial Refueling Track	256.650	274.450
AR-7A	Aerial Refueling Track	276.500	256.650
AR-7B	Aerial Refueling Track	236.650	256.650
AR-8A	Aerial Refueling Track	240.350	256.650
AR-8B	Aerial Refueling Track	305.500	256.650
AR-010 (SE/NW)	Aerial Refueling Track	278.750	292.600
AR-41V	VFR Helicopter Refueling Tracks	230.050	260.200
AR-112H (E/W)	Aerial Refueling Track	235.100	260.200
AR-112L (E/W)	Aerial Refueling Track	295.800	260.200
AR-135V (N/S)	VFR Helicopter Refueling Tracks	238.500	233.725
AR-136V (N/S)	VFR Helicopter Refueling Tracks	233.725	238.500
AR-137V (N/S)	VFR Helicopter Refueling Tracks	233.725	238.500
AR-202 (N/S)	Aerial Refueling Track	327.600	343.250
AR-209 (E/W)	Aerial Refueling Track	238.900	256.650
AR-216 (NE/SW)	Aerial Refueling Track	276.500	343.250
AR-219	Aerial Refueling Track	305.500	282.700
AR-220	Aerial Refueling Track	274.450	282.700
AR-255L (E/W)	Aerial Refueling Track	327.600	365.775
AR-302 (E/W)	Aerial Refueling Track	278.750	260.200
AR-315 (E/W)	Aerial Refueling Track	343.250	236.650
AR-324	Aerial Refueling Track	327.600	343.250
AR-328	Aerial Refueling Track	235.100	343.250
AR-332 (NE/SW)	Aerial Refueling Track	235.100	343.250
AR-406H (E/W)	Aerial Refueling Track	396.200	297.300
AR-406L (E/W)	Aerial Refueling Track	297.300	396.200
AR-610A/B	Aerial Refueling Anchor	295.400	292.600
AR-617	Aerial Refueling Anchor	324.600	343.250
AR-618	Aerial Refueling Anchor	348.900	343.250
AR-620	Aerial Refueling Anchor	238.900	343.250
AR-633A/B	Aerial Refueling Anchor	240.350	343.250
AR-638	Aerial Refueling Anchor	324.600	343.250
AR-642 (E/W)	Aerial Refueling Anchor	291.650	319.500
AR-648A/B	Aerial Refueling Anchor	238.900	256.650
AR-653	Aerial Refueling Anchor	324.600	260.200
AR-655	Aerial Refueling Anchor	276.500	343.250
AR-659	Aerial Refueling Anchor	291.650	319.500
AR-716	Aerial Refueling Anchor	283.900	342.550



USAF 96EBS B-52 KC-135 Refueling

After a complete review of this new reference, the biggest change I noticed was that aerial refueling frequencies 319.500 and 319.700 MHz were replaced by 256.650 and 343.250 MHz respectively. Not all of the 319.5/319.7 aerial refueling frequency assignments have changed as of presstime, but a significant number have. If your local AR route uses 319.500 or 319.700 MHz, you need to plug in the new frequencies above or get ready for your old frequencies to go silent at some point. Those new frequencies will be in use nationwide very soon.

The information in Table One is a complete list of all the routes that have been affected by the recent changes and their primary and secondary refueling boom frequencies. The frequencies are in Megahertz (MHz) and the mode is AM.

Following is a list of the aerial refueling frequency changes in frequency order.

TABLE 2: AERIAL REFUELING FREQUENCY CHANGES

233.725 AR-136V (North/South) Primary; AR-137V (North/South) Primary; AR-135V (North/South) Secondary
 235.100 AR-332 (NE/SW) Primary; AR-112H (East/West) Primary
 236.650 AR-007B Primary; AR-315 (East/West) Secondary
 238.500 AR-135V (North/South) Primary; AR-136V (North/South) Secondary; AR-137V (North/South) Secondary
 240.350 AR-008A Primary; AR-318 (East/West) Primary; AR-633A/B Primary
 256.650 AR-005L (East/West) Primary; AR-006 Primary; AR-001 (East) Secondary; AR-002 (West) Secondary; AR-003L Secondary; AR-007A Secondary; AR-007B Secondary; AR-008A Secondary; AR-008B Secondary; AR-209 (West/East) Secondary; AR-648A/B Secondary
 260.200 AR-041V (North/South) Secondary; AR-112H (East/West) Secondary; AR-112L (East/West) Secondary
 265.500 AR-003H (East/West) Primary
 271.650 AR-003H (East/West) Secondary
 274.450 AR-220 Primary; AR-006 Secondary
 278.750 AR-010 (SE/NW) Primary; AR-302 (East/West) Primary; AR-005L (East/West) Secondary
 291.650 AR-642 (East/West) Primary; AR-659 Primary
 292.600 AR-610A/B Secondary
 295.800 AR-112L (East/West) Primary
 297.300 AR-406L (East/West) Primary; AR-406H (East/West) Second-

ary
 305.500 AR-219 Primary
 324.600 AR-653 Primary
 327.600 AR-324 Primary; AR-255L (East/West) Primary
 342.550 AR-005H (East/West) Secondary; AR-716 Secondary
 343.250 AR-315 (East/West) Primary; AR-324 Secondary; AR-332 (NE/SW) Secondary; AR-202 (South/North/Alt North) Secondary; AR-216 (NE/SW) Secondary; AR-328 Secondary; AR-617 Secondary; AR-618 Secondary; AR-620 Secondary; AR-633A/B Secondary; AR-638 Secondary; AR-655 Secondary

❖ US Air Force Trunk Radio Systems

From time to time I get a lot of requests for frequencies used by DoD trunk radio systems. Since these trunk radio systems have come online, many of the older conventional radio frequencies used by the military have been abandoned. I have compiled the latest information from my files on trunk systems in the 406.1 to 420 MHz on US Air Force bases in CONUS. Any additions and corrections to our list can be sent to the email address in the masthead.

Andrews AFB, MD

406.3500c 406.9500c 407.1500c
 407.4250c 408.0250 408.2000 408.7500
 408.9500 409.3500 409.7250

Arnold AFB, TN

406.7500 407.5500 408.3500 409.1500
 409.9500

Barksdale AFB, LA

406.3500 406.7500 407.1500 407.5500
 407.9500 408.2000 408.7500 409.1500
 409.5500 409.7500 409.9500c
 410.2000

Beale AFB, CA

406.7625c 406.9625c 407.1625c 407.9625c
 408.1625 408.7625 410.3625

Buckley ANGB, CO

Site-1 406.5000c 406.9750c 408.0750c
 409.4000 410.5500c
 Site-2 406.7750c 407.1250c 407.8125c
 408.4250c 408.7750
 Site-3 406.9875c 408.2750c 409.0250c
 409.9250c 410.4250

Site-4 407.0000c 408.4500c 410.6500c

Columbus AFB, MS

406.3625/415.3625 406.5625/415.5625
 406.7625/415.7625 406.9625/415.9625
 407.9625/416.9625 408.7625/417.7625
 410.3625/419.3625

Davis-Monthan AFB, AZ

Site 1 406.1125c 406.1500c 406.7625c
 406.9625c 407.3625 407.8125 407.8875
 408.0500 408.0875 408.1250 408.1500
 408.5625 409.0250 409.2750 409.4500
 409.5625 410.5625
 Site 2 408.7625c 409.6875c

Edward AFB, CA

Site 1 406.1625 406.1875 406.3500
 407.1625 407.2500 407.2875 407.4375
 407.4500 407.5625c 407.7625 409.2000
 409.3625 [AFRL]
 Site 2 406.7625 407.2000 407.3625
 407.4750 407.6375 407.8375 407.9625
 408.0000 408.1625 409.0000 409.1625
 409.4250 409.5375 409.5625c 409.7000
 [Edwards]
 Site 3 406.3250 406.6375 406.8000
 406.9625 407.2375 407.4000 407.4750
 407.6375 410.7625c 410.9000 [Rosamond Hills]

Other reported frequencies: 406.3625
 407.2750 409.2250 409.8250 410.1500
 410.5250 410.7500

Eglin AFB, FL

Site 1 406.7500 407.5500 408.0500
 409.9500
 Site 2 406.3500 407.1500 407.9500
 Site 3 407.5500 407.6000 408.0500
 408.1000 408.6500 409.0250 409.2250
 409.3000 409.3500 409.6500 409.9000
 410.2000
 Site 4 406.9500 407.1500 407.3750
 407.9500 408.1750 408.7500 409.1250
 409.3750 409.4250 409.7750 411.5500
 412.9750 413.4250

Elmendorf AFB, AK (EDACS System)

406.3500 (LCN01) 407.1500 (LCN02)
 407.9500 (LCN03) 408.7500 (LCN04)
 409.5500 (LCN05) 410.2000 (LCN06)
 408.3500 (LCN07) 408.9500 (LCN08)
 409.1500 (LCN09) 409.7500 (LCN10)

General Mitchell International (Milwaukee), Wisconsin

407.2500c 407.5750c 408.5500c
 409.1500c

Grand Forks AFB, ND

406.3500c 406.5500c 407.1500 407.3500c
 407.9500 408.1500 408.7500

Hickam AFB, HI

415.1500 415.9500c 416.7500c 417.5500c
 418.2500c 418.5500

Hill AFB, UT

406.1500 406.7500 406.9500 407.2500
 407.5250 408.0250 408.5500 408.9500
 409.1500 409.7500

Holloman AFB, NM

Site 1 406.2250c 407.3250 407.5500
 409.3250c 409.5500 409.8000 [White Sands Missile Range]
 Site 2 406.8750 407.1750c 407.5000c
 407.5500 408.1625 408.3625 408.9625
 409.3750 409.5750 409.7500 409.9625
 [Holloman]
 Site 3 407.1500c 408.150 409.3000
 409.5000 [Carrizozo]
 Site 4 408.5500c [SE WSMR]
 Site 5 406.5500 407.5500 407.7500
 408.1000 409.3500 410.1500c [Las Cruces]

Site 6 407.0750c 408.4250 [Ft. Bliss]
 Site 7 406.5000 406.8750 407.3500c
 407.9500 [SE Las Cruces]
 Site 8 406.5500 407.5625 407.7500c
 408.4250 409.9750 [North WSMR]

Kirtland AFB, NM

406.1500c 406.5625c 406.7625c 406.9250c
 406.9750 407.1875 407.3875 407.5875
 407.7875 407.9625 408.0875 408.1750
 408.3875 409.4250 409.7750

Langley AFB, VA

406.5500 406.7500 407.1500 407.3625c
 407.9500 408.1625c 408.5500 408.7500c
 408.9500 409.1500 409.3500c
 409.9500

Little Rock AFB, AR

406.9625c 407.1625 407.9625
 409.7625

Los Angeles AFB, CA

406.4250c 407.3750c 408.3500c
 408.9500c

Luke AFB, AZ

406.3500 406.9500 407.1500 407.9500
 408.1500 408.2000 408.7500 409.1500
 409.3750c 409.5500c 409.7750c
 409.9500c

MacDill AFB, FL

406.5625c 406.7625c 406.9625 407.3625
 407.5625 407.7625c 407.9625c 408.1625
 408.3625 408.5625

Maxwell AFB, AL

Site 1 406.1625 / 415.1625
 407.9625/416.9625 408.7625/417.7625
 409.7125/418.7125 410.7625/419.7625c
 [Maxwell]
 Site 2 406.1125 / 415.1125c
 406.3625/415.3625c 407.2875/416.2875

410.3625/419.3625 [Gunter Annex]

McChord AFB, WA

407.3750c 409.2000c 409.3000c
 409.4250 409.5000 409.7000
 409.9000

McGuire AFB

Site 1 406.7500 406.9500c 407.3625
 407.5625c 408.1625 408.3500c
 408.5625 408.9500 409.5625 410.0000
 413.2000
 Site 2 406.3625 407.4750
 Site 3 410.5625 410.7625
 Other frequencies: 409.0125 409.3500c

Next month I will publish Part 2 of the US Air Force trunk radio systems.

❖ New Georgia Military Net

Marat and the UDXF gang have posted quite a bit of information regarding HF military networks used by the military forces from the country of Georgia. Recently another military automatic link establishment (ALE) net has been uncovered by Marat.

"GS2-net"

Net Control Station ALE Address – GS2
 Other ALE Addresses – 4L1, AIR, AKH, GS2, KD1, KSI, NIK, SAK, TB1

Freq list (all ALE/USB):

3200.0 3400.0 3450.0 4100.0 4350.0
 4550.0 4850.0 (used "GS2" and "KD1" only)
 4851.7 (used "4L1" and "NIK" only)
 4900.0 5280.0 5350.0 5595.0 5650.0
 6050.0 6250.0 6500.0 6750.0 7650.0
 7850.0 8450.0 8650.0 kHz.

❖ Milair Band 225-400 MHz Spectrum Holes

I have written a lot over the years in this and other media about what I call "spectrum holes" in the 225-400 MHz range. In brief, a spectrum hole is a legit frequency for assignment based on current channel spacing, but no activity/current assignment has ever been heard/found for the frequency. That is a spectrum hole.

If you are interested in exploring the world of 225-400 MHz spectrum holes, I have them listed on my Milcom Monitoring Post blog. Here are links to all six parts.

<http://mt-milcom.blogspot.com/2006/08/milair-spectrum-hole-list-part-1.html>
<http://mt-milcom.blogspot.com/2006/08/milair-spectrum-hole-list-part-2.html>
<http://mt-milcom.blogspot.com/2006/10/milair-spectrum-hole-list-part-3.html>
<http://mt-milcom.blogspot.com/2007/01/milair-spectrum-hole-list-part-4.html>
<http://mt-milcom.blogspot.com/2007/03/milair-spectrum-hole-list-part-5.html>
<http://mt-milcom.blogspot.com/2007/08/milair-spectrum-hole-list-part-6.html>

And, if you don't have room for the complete list, here is the big Milcom challenge: The following freqs are the biggest Milair unknowns on the planet. If you hear something on these I would really like to hear from you. Try programming these mystery freqs: 233.600 252.300 252.600 277.300 293.900 298.200 336.700 371.400 MHz.

That does it for this month. Until next time, 73 and good hunting.

Cheaters, or not?

Over the years, DXers have heard a lot about stations “cheating.” The term refers to AM stations that should go off the air at night continuing to operate after hours, or stations that should reduce power at sunset failing to do so. This is hardly an unusual practice, but sometimes it may not be what it seems. Theoretically, a “daytime-only” AM station should go off the air at sunset. In practice, it isn’t quite that simple. There are a number of reasons why you might hear a “daytime-only” station well after the sun is gone.

Real sunset and “FCC sunset” are two different things. FCC regulation 73.1720 states that “FCC sunset” is the same time every day of any given month; it’s sunset on the 15th, provided by the U.S. Naval Observatory, and adjusted to the nearest 15 minutes. (Likewise for sunrise.)

What this means is that in October, “FCC sunset” is “too early” in the first half of the month; stations are required to go off the air/reduce power before the sun has actually gone down. The opposite situation happens at the end of the month. According to the Observatory, sunset on October 22 at Ashland City, Tennessee, is 6:04pm – but the rounded sunset time on the WQSV-790 license is 6:15. WQSV may legally remain on the air at full power for 11 minutes after sunset on this date.

Or maybe later. Many “daytime-only” AM stations also possess a “Post-Sunset Authority” (PSSA). This allows operation up to two hours after sunset, usually at reduced power. PSSA powers listed in the FCC Database are not necessarily accurate – there was a disastrous attempt to revamp the figures last winter – but they do give you an outline as to what’s going on.

For WQSV-790, in October, a full two hours of PSSA operation are listed, at 32 watts. WQSV is allowed to broadcast at this reduced power between 6:15 (“FCC sunset”) and 8:15pm. In WQSV’s case, this turns out to be pointless, because the station has authorization to operate all night at 35 watts. However, in December between 5:30 and 6:00pm, WQSV is allowed a PSSA power of 75 watts. (December sunset is 4:30.) The station may operate at increased power during this half-hour period. In practice, I highly doubt they will bother.

Most “daytime-only” – Class D – stations also have a “Pre-Sunrise Authority” or PSRA. This allows operation between 6am and “FCC sunrise,” usually also at reduced power. In WQSV’s case, in most months this pre-sunrise operation is limited to the same 32 watt figure that appears in their PSSA. It would make more sense to stick with the 35 watt authorized night power. However, in December WQSV may begin operating at its full 500 watt daytime facilities at 6am, even though sunrise

doesn’t happen until 7:45. In February “daytime” operations may begin 30 minutes before sunrise. DXers don’t usually seem to report PSRA operation as “cheating.” Maybe we just aren’t early risers?!

Again, let me remind you that the PSSA/PSRA powers mentioned in this article and available on the FCC CDBS link, are *not* in effect. They’re just to give you an idea of how PSSA/PSRA works. The FCC has announced they are reviewing the entire PSSA/PSRA process; you might expect new and more accurate figures soon. (Or, given how long it’s taken the nighttime IBOC proceeding to work its way through the bureaucracy, we may all be dead by the time they finish...)

❖ Testing, testing ...

Another legal means for stations to operate at daytime facilities after hours is the “Experimental Period.” FCC regulation 73.1520(b) authorizes test and maintenance operation between midnight and sunrise if no interference is caused to stations maintaining a regular schedule. (This regulation was written at a time when few stations remained on the air after midnight!) Regular and scheduled programs are not permitted. The idea is to allow stations to work on their daytime facilities late at night, when nobody is listening and they can afford to annoy the audience with test tones! This is, of course, also the genesis of the “DX Test.” Not all test broadcasts sound like tests.

Propagation conditions vary. A signal that blasts in one day may be nearly inaudible the next. The station that seems to be operating at illegally high power may in fact be the beneficiary of unusually good propagation. Or unusually bad propagation. A common example is auroral absorption. The D-layer that prevents daytime DX may become unusually intense, and may continue to limit DX at night as well over northern paths. DX stations to your north may disappear, unmasking southern DX that’s not normally audible. Since AM DX is generally limited by interference, not signal strength, these southern stations may sound like they’re operating at higher power – but may simply be benefitting from a reduction in interference.

Finally, sometimes stations *do* cheat! It’s by no means unheard of for a station to operate after hours at daytime power without authority. There’s a link to a Notice of Apparent Liability in the sidebar, where the Commission proposes to fine a North Carolina station \$4,000 for operating at at least 8,000 watts during hours when the power should be limited to 56 watts. I don’t mean to pick on WZGM; if you poke around the Enforcement Bureau website you won’t have any trouble finding other examples.

BREAKING NEWS:

Nighttime IBOC – finally here...

As fall approaches, some in the DX community (and for that matter, in the broadcast engineering community) began asking: “Why haven’t the IBOC rules been published in the Federal Register yet?” The Mexican government filed a formal complaint; some speculated that the FCC had put IBOC on hold. A variety of other theories appeared.

I really figured it was just plain old bureaucratic delays. I figured once it was formally released by the FCC, that was it. If for some reason the FCC changed their mind, they’d have to go through the process again.

Look at another, far less controversial proceeding: the 3rd DTV Periodic Review. This proceeding was released on April 25th, a month and six days before the IBOC rules. The DTV Periodic Review was published in the Federal Register on July 10th, 76 days later. If you add 76 days to the May 31st release of the HD Radio rules, you get August 15th. Well, guess what? I’m writing this on August 15th – and the final IBOC rules were published in the Federal Register this morning.

This action set the 30-day clock on nighttime AM-IBOC. The effective date was September 14th – a few days before most of you are reading this. A number of changes will happen on this date, but the only one most listeners will notice is that AM stations may now leave the HD on all night. Stations that are non-directional day and night will not have to make any changes except to disconnect the timer that turns the HD off at sunset. (This will include many of the big 50 kW outlets.) Stations that do go directional at sunset will have to ensure their nighttime antenna systems won’t “mangle” the HD sidebands. I expect this will be an easy process at some stations – and a much harder process at others.

What exactly will happen to the AM dial, and to our DX hobby? As you read this, we’ll be finding out. Remember that the DX hobby has survived major changes before. HD will add challenges, and opportunities. Keep your eyes (and ears!) open.

I would hope it would go without saying that a DXer should never mention suspected “cheating” when writing a reception report. It is highly unlikely a station will verify in writing that it was operating at excessive power! It’s best to

AM BANDSCAN STATION REPORT

NEW

New AM stations on the air:

Dilworth, Minn. 1100 WZFN 50,000/440 DA-N (near Fargo, North Dakota)

New AM station permits granted:

Maxwell AFB, Ala. 1030 35,000/1,000 DA-2
 Bishop, Calif. 1490 1,000/1,000 ND
 Petal, Mississippi 1520 50,000/700 DA-3
 Fitzwilliam Depot, N.H. 870 780/400 DA-N; granted calls WZNH.
 Iola, Texas 1450 250/250 ND
 Richfield, Utah 1490 1,000/1,000 ND
 Big Horn, Wyo. 1370 10,000/250 DA-N

New AM station applications dismissed:

San Luis Obispo, Calif. 850
 Clayton, Ga. 1400
 Missoula, Mont. 1050
 Bend, Oregon 1400
 Montreal, Que. 650, 1400, 1410

Applications for new AM stations:

Lithonia, Ga. 1360 2,400/1,300 DA-2 (Atlanta suburb)
 Sauk Rapids, Minn. 540 250/250 DA-2
 Whitefish, Mont. 1450 420/420 ND
 Hawthorne, Nev. 1490 790/790 ND
 Big Spring, Tex. 730 500/230 DA-2

CHANGES:

AM stations moved to new frequencies:

Monticello, Me. 780 WCXN moved from 710kHz; adds night operation at 60 watts.

Frequency changes granted for AM stations:

Sydney, N.S. 97.1 CBI moves from 1140 AM; 61,400 watts.
 Waynesburg, Pa. 1210 WANB moves from 1580; 5,000 watts.
 Grafton, W.V. 1190 WTBZ moves from 1260; 4,500 watts.

AM stations requesting frequency changes:

Chalmette, La. 1100 WOMN to move from 1110 at Franklinton; 50,000/250 DA-3
 Montrose, Penna. 800 WPEL to move from 1250; 1,000/137 ND

AM stations granted moves to new cities:

Tucson, Ariz. 1080 KGVY to move from Green Valley, increase power to 1,400 watts.
 Rosamond, Calif. 1380 KWJL to move from Lancaster. No technical changes.
 Sanger, Calif. 1370 KGEN to move from Tulare, 3,800/102 DA-D.
 Ripley, Ohio 1180 KELE to move from Mountain Grove, Missouri (460mi. west!) and change frequency from 1360.
 Catoosa, Okla. 1120 KEOR to move from 1110kHz at Atoka, reduce power to 2,000 watts.
 San German, P.R. 1510 WBSG to move from Lajas. No technical changes.
 College Stn., Tex. 1550 KWBC to move from Navasota and increase power to 1,400/24 DA-D.
 Bluffdale, Utah 960 KOVO to move from Provo and increase power to 50,000/940 DA-2

AM stations requesting moves to new cities:

Plum Springs, Ky. 1450 WCDS to move from Glasgow, about 30 miles east.
 Kanab, Utah 1560 WAMI to move from Opp, Alabama (1,550mi. east!), change frequency from 860, and decrease power to 250 watts daytime only.

AM station moves dismissed:

Phoenix, Ariz. 1010 KXXT would have moved from Tolleson.
 Pineville, La. 1490 KEUN would have moved from Eunice.
 Capleville, Tenn. 1180 WPLX would have moved from Germantown.

Call letters assigned to new AM stations:

Leone, Am. Samoa 900 KKHJ
 Pocomoke City, Md. 1070 WBEE
 Hampden, Me. 750 WRME
 Baxter, Minn. 1180 KYES
 Lancaster, N.H. 1490 WKDR
 South Boston, Va. 1400 WAJL

simply ignore the issue when dealing with stations. At many smaller stations, the advertising sold during Friday night football games keeps the station afloat. Advertisers probably won't buy time on a station they can't hear... If the station actually did reduce power as required during the game, the lost advertising could conceivably drive it into bankruptcy. Some stations are probably willing to take the relatively minor risk of a FCC fine.

Indeed, the practice of operating at excessive power after hours to cover Friday night football is so prevalent that I've found many small-station personnel believe it's legal! Prosecutions are so rare, compared to the number of stations doing it, that I have to suspect the FCC doesn't bother enforcing this rule on Fridays unless some other station complains.

❖ More Test Broadcasts

Remember last winter's mysterious test tones on 590/1020/161kHz? It looks like they're coming back... Glenn Hauser's *World of Radio* is reporting two experimental licenses have been issued to Oklahoma State University for similar tests. This time, there are two sites, two sets of frequencies, and more details.

One site is Chilocco, Oklahoma, on the state line between Ponca City and Arkansas City, Kansas. The frequencies to be used are 540, 830, and 1680 kHz. They also have permission to use 92.3, 99.1, and 107.5 MHz FM. (The former two frequencies seem a bit dangerous, as there are licensed stations on these frequencies in nearby Wichita, Kansas!) The other site is Flying H, New Mexico, between Roswell and Alamogordo off Highway 82. The frequencies here are 530, 950, and 1680 kHz, as well as 88.3, 97.7, and 107.3 MHz FM.

The licenses list all AM transmissions as 30 kW effective radiated power (ERP). FM power is listed as 5 kW ERP. They also mention tests on ten shortwave frequencies and on TV – TV channels not specified. Call letters WE2XFZ apply to all AM and FM transmissions at both sites. (A separate call sign, WE2XFV, has been issued for the shortwave tests.)

The 530 and 1680 kHz transmissions should certainly be widely heard, and I wouldn't be surprised if many DXers hear the other AM frequencies as well. Unlike last year's tests, these licenses indicate the stations have the ability to identify themselves. Maybe this year, we'll *know* what we're hearing<grin>!

❖ Bits & Pieces

There is currently only one daytime-only radio station remaining in Canada (CKOT-1510 Tillsonburg, Ontario). An application had been filed for a second such operator, for a 5,800-watt station on 650 in Montreal. In Canada, you can have call letters assigned before a permit is issued. This station received the calls CKZW, but they will never be used as the application was dismissed. CKOT will remain Canada's only daytimer.

Note this month some long-distance moves on the AM dial. KELE-1360 has been granted permission to move from Mountain Grove in southern Missouri to Ripley in southern Ohio. That's a distance of 460 miles! The station will also change frequency to 1180. Confusingly enough, the transmitter will be in Kentucky. Ripley is located on the Ohio River; the transmitter will be on the other side of the river.

A much longer move has been requested, but not yet approved. This move would have WAMI-860 Opp, Alabama, moving to Kanab, Utah! That's 1,550 miles. The move would also have the station change frequency to 1560 kHz.

As bizarre as these long-distance moves may seem, they are not unprecedented. Today's KAAV-1090 Little Rock was originally licensed to Hot Springs, about 30 miles to the west. WLBL-930 Auburndale, Wisconsin, has lived in Waupaca and Stevens Point before settling in its current location. The grand prize for long-distance moving (at least before WAMI came along) probably goes to KYW-1060. Today's DXers know KYW as a Philadelphia station – but it once lived in Chicago.

Another FM translator has been authorized to relay an AM station. WDXV-1240 Sumter, South Carolina, will be carried on W290AY, 105.9 MHz, 250 watts. WDXV joins Tennessee station WGNS-1450 and fellow South Carolina outlet WRHI-1340 in being relayed on FM.

❖ Till next month

Who will be the first to hear KELE at its new digs in Ohio – uh, Kentucky? Write me at 7540 Highway 64 West, Brassstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!

URLs in this month's column:

<http://americanbandscan.blogspot.com> - My AM DX blog
http://aa.usno.navy.mil/data/docs/RS_OneDay.html - U.S. Naval Observatory sunrise/sunset time calculator
http://svartfoss2.fcc.gov/prod/cdbb/pubacc/prod/sta_sear.htm
 FCC CDBS database search page
www.fcc.gov/eb/FieldNotices/2003/DOC-271610A1.html - Example Notice of Apparent Liability for an AM station operating at high power after hours
www.worldofradio.com/ - Glenn Hauser's World of Radio
www.crtc.gc.ca/eng/whatsnew.htm Today's Releases of the Canadian Radio-television and Telecommunications Commission
<http://newstalk.miller.fm/> - WDXV-1240 – and now 105.9 FM

Winter DX and Column Research

G0TAG/mm here is VE3GO, go ahead. VE3GO, this is G0TAG/mm, Dave, aboard the sailing vessel RUAH, in position 35.06 North, 75.55 west, crossing Abermarle Sound, in NC. Roger Dave. 6Y5RP, Rooney, I have a position report from G0TAG/mm, to be relayed to Shiptracks.

This is just one example of the marine traffic you might handle for the Maritime Mobile Service Net on 14,300 kHz USB. I often monitor the net and relay for net control when I can. It's just one of the many places you can hear marine radio traffic on the amateur bands. It is a good net to have in the background when I am working, and it's on daily. I also monitor 3755 LSB for the Ontars Net to listen for my friend VA3RJB/mm on the lake freighter *Algosteel*. Ron is often on between 0700 and 0800 local time.

❖ Research and Planning

Since this October column has to be written in late summer, I'm getting busy by listening to maritime traffic. Normally I would be listening about now to radio traffic at the American LeMans Series race at Mosport. (Just one more use for my trusty scanner.) Most of the communications around the racetrack is on 450 MHz, but I am also informed that the cruise ships use these frequencies for internal communications.

I plan to check that out as well: About the time you are reading this column in *Monitoring Times*, my wife and I plan to be on the East Coast color cruise aboard the *Norwegian Dawn*. We will visit New York, Boston, Bar Harbor, Halifax, Quebec City, the Saguenay River, Cornerbrook, and Sydney before returning to New York. According to the Port of Quebec web site, the *Queen Elizabeth II* will also be in port. I hope to get a picture of this vessel against the background of the Chateau Frontenac. The high bluffs at Quebec should make this a great shot.

I am also using this preparation time to



August would usually find me listening to the LeMans Series instead of ships!

research the frequencies which are active in the ports, on the Atlantic Ocean, Gulf of St. Lawrence, and St. Lawrence River. It has been 43 years since I was on a ship in this area. When I was a high school student, I got a chance to be a guest aboard the *MV Halifax*, a self-unloading lake vessel used to carry coal from Sydney NS to Toronto, Ontario.

Various contributors helped me compile a list of frequencies for the port of New York, which has been published in a previous issue of *MT*. I am looking up the other areas and hope to monitor HF and VHF while on the ship. The 2 meter amateur frequencies are also being checked for repeaters and IRLP nodes useful for the voyage. Bill Dunn, N1KUG has already sent me the research on 450 MHz marine frequencies, Boston Harbor frequencies, and the amateur repeaters used in the area. He gives the frequencies of 146.670 MHz, -600 offset, 146.2 Hz tone and 224.000 MHz, 103.5 Hz tone located in Quincy. I do not have 220 MHz, but will surely give the 2 meter repeater a good try with my trusty Icom T90A. It would be great to have had a contact with a reader.

For the Canadian marine frequencies, HF and VHF, I use the book *Radio Aids to Marine Navigation*, published by the Canadian Government. There are editions for the West Coast region as well as the East Coast and Arctic region. This publication is issued every spring and kept up to date through Notices to Mariners. You can read this by putting the title into any Internet search engine.



Ron Bird VA3RJB aboard the Algosteel.

I also want to research some DX marine frequencies as well as some digital frequencies for the winter DX season. Better to be listening to a radio in the warmth of a radio shack than be out in the cold and snow, when you do not have to be. I plan to have some results from my trip and listening in the January column. As always, any frequency information readers can provide would be most useful, as I know frequencies logged by readers are active ones.



❖ Annual Rush to the Sea

North American monitors are reminded that the annual rush to the sea for the ocean ships on the Great Lakes starts in late November and runs until about the end of the year. Traffic in the St. Lawrence, eastward from Montreal, will also be high until the early new year. Icebreaker traffic on the St. Lawrence River is quite heavy, as the river is kept open up to Montreal all year.

The St. Lawrence Seaway Authority starts issuing bulletins on December 1st listing the water temperature at the St. Lambert lock, the number of ocean ships above Montreal and Port Weller (Welland Canal), and ice conditions. During this yearly rush, there are usually a few incidents and weather problems to make the traffic worth monitoring.

Marine channels 11, 12 and 14 are used for the ship traffic control from the upper lakes to the Gulf of St. Lawrence. Channel 13 is used for bridge-to-bridge communications between commercial vessels. However, channel 13 is also used for ship traffic control from the middle of Lake Ontario up to Crossover Island, near Brockville, Ontario. Ship to ship commercial traffic is usually on channels 8 and 10. Of course, ship enthusiasts like me use this information to get some good pictures.

For those of you who like to follow the ships on the Lakes or who are too far away for VHF communications, the website www.greatlakes-seaway.com will give you all the radio messages, notices, and a map showing most of the ships in the system. However, tankers and Coast Guard vessels are not listed. The website www.boatnerd.com will give you daily shipping news, port reports and other information on Great Lakes shipping. The websites for the ports of Montreal, Quebec City and Halifax have excellent port reports.

The only HF communications I have heard on the Great Lakes have come from the Traverse City, Michigan, Coast Guard base and helicopters. They occasionally show up on 5696.2 and, I have been told, 5692 as well.

❖ HF Broadcasts across the World

Following are some marine broadcast frequencies that I hope will be of interest to readers. I decided to research the marine broadcasts from Canada since I would be traveling the East Coast this fall, and also include some Australian information for some DX listening challenges. All listings are for USB and frequencies are in kHz. All listings are from the 2007 edition of *Radio Aids to Marine Navigation*.

CANADA (Coast Guard Radio Stations) East Coast and Northern Arctic

VFF Iqaluit, Baffin Island

Weather Broadcasts

Transmitter	UTC	Frequencies
Iqaluit	1340, 2235	2582, 4363, 6507
Resolute	240, 2310	2582, 4363
Coral Harbour	1320	2514, 6513
Killinek	1340, 2235	2514
All transmitters	1705	



The stern of Algosteel as it leaves lock three and showing the location of Ron's wire antenna on starboard (right) side at the stern. Not really visible, but it shows where he hangs it from the unloading machinery to the stern cabin deck.

Traffic Lists

All transmitters 0135 + every 4 hrs 2514, 2582, 4363, 6513

East Coast Stations on 2598 kHz

Station	UTC
VOK Labrador	0137, 1007, 1107, 2037, 2307
Placentia	0048, 0737, 1137, 1607, 1807
Port au Basques	0207, 0807, 1207, 1507, 1837, 2107
St. Anthony	0107, 0907, 12137, 1337, 1907, 1937
VON St. John's	0007, 0837, 1307, 1637, 2007, 2207

East Coast Stations on 2749 kHz

Station	UTC
VCO Sydney	0040, 0740, 1440, 2010 UTC
St. John, NB	0140, 1040, 1640, 2040 UTC
Riviere au Renard*	0437, 0847, 0937, 1407, 1737, 2317 UTC
VCS Halifax	0240, 0810, 1540, 1940 UTC

*(also on 2598)

VBA Thunder Bay radio also provides HF service by remote transmitters at Churchill, Manitoba, for Hudson Bay. This service usually goes from mid May until late October. The station monitors 2182 as well as 2582 and 4375 kHz. Ships would be heard on 2182, 2206, and 4083 kHz, respectively. Broadcasts are on 2582 kHz at 0040, 1410 and 1520 UTC. Traffic lists are on 2582 at 0155 and every four hours thereafter.

❖ West Coast and Western Arctic

Inuvik operates from mid May until Late Oct. From their Inuvik site they broadcast on 5803 at 0115 UTC and 6218.6 at 1435 UTC. They broadcast from Hay River at 1315 UTC on 4363 and from Cambridge Bay at 0235 on 2558 and 4363.

A broadcast frequency of 2054 kHz is used by VAE Tofino at 0450, 100, 1650 and 2250 UTC and VAJ Prince Rupert at 0505, 1105, 170 and 2315 UTC.

4125 kHz is also listed for many stations

on the West Coast.

❖ AUSTRALIA

Marine and weather broadcasts for Australia are sent from two stations: VMC Charleville, Queensland, and VMC Wiluna, Western Australia. Times here refer to local time at the transmitter. The broadcasts are in USB and there are many throughout the day, especially on the hour and half-hour. Special announcements are five minutes before the hour and 25 minutes after the hour.

Station	Day (0700-1800)	Night (1800-0700)	Anytime
VMC	4426, 16546	2201, 6507	8176, 12356
VMW	4149, 16528	2056, 6230	8113, 12360

A coordinated set of eight radio stations broadcast navigation warnings on 8176 kHz. They are located at Gladstone, Cairns, Darwin, Perth, Adelaide, Melbourne, Hobart and Sydney. They also monitor distress frequencies of 4125, 6215 and 8291. GMDSS on 2187.5 was also mentioned.

The volunteer coast guard was listed as using 2112, 2284, 2436 and 2524 kHz in many locations.

This information (courtesy of *The Victorian Scanning News*) should provide a challenge for the North American DXer. I hope I can QSL some of these stations for my log.

❖ Final Notes

Radio Aids to Marine Navigation also indicated that VHF DSC was being installed at VBR Prescott and VBE Sarnia Coast Guard radio stations, this year. The equipment should be installed by June 1, and full operation is planned for Sept. 1, this year.

Hopefully my fall cruise and reader input will result in some interesting frequencies for the January column. I look forward to hearing from you! 73 and good DX!

Antenna Wrap-Up: Active Antennas

My first “real” job after college was at Scientific Radio Systems (SRS) in Rochester, NY. I was excited to start my new position as a Technical Writer, in large part because SRS had just landed a contract with the FAA to build 160 longwave beacons, and a number of monitor receivers – complete with active antennas. I’d be writing about something I enjoyed as a hobby! What more could I ask for?

A few days into the job, I was introduced to the Engineer designing the active antenna for the FAA program. He showed me a prototype design that consisted of an aluminum rod about 1-meter long, attached to a small box housing the antenna’s amplifying circuit. I was amazed at how short the antenna was. I assumed antennas had to be very large to work at LF. How could such a tiny antenna work on a band where wavelengths approached a mile?

I soon discovered that these antennas can work very well indeed on longwave. In fact, when properly installed, they can rival (or beat) wire antennas hundreds of feet long. This month, we’ll discuss the characteristics of active antennas for LF reception. If you’re just joining us, this is the third and final part of a series on LF receiving antennas. The two previous columns discussed the merits of random wire antennas and loop antennas, respectively.

❖ What’s in a Name?

Active antennas get their name from the fact that they contain active (powered) circuitry for amplifying the very weak signals picked up by the antenna rod. In effect, what the antenna lacks in length, it attempts to make up for in amplification. A good design will also contain cut-off filtering that attenuates signals above about 500 kHz, minimizing the possibility of AM broadcast interference.

Active antennas have several advantages for today’s listener. First, their small size makes them easy to mount to a vent tube, gutter, or small mast. Also, because they are small, they tend to be less of a “noise collector” compared to random wire antennas – a clear advantage for urban/suburban dwellers. Finally, active antennas are omni-directional. This might seem like a disadvantage to some, but an omni antenna gives you the “big picture” when tuning across the band. You can always switch to a directional “loop” antenna when you find a signal of interest. With a loop alone, you’re apt to miss many signals that are not in the favored plane of the antenna.

Active antennas require DC power to oper-

ate. The power supply can be located in the shack, and may be as simple as a 9-volt battery or AC adapter, depending on the power requirements of the antenna. The power is usually supplied via the coax feedline, so there’s no need to run separate wiring to the antenna. The LF Engineering antenna shown above is an example of an active antenna.

Experimenting with the best mounting location for an active antenna can have big payoffs. Their small size makes it convenient to do this, so that you can find a spot with the lowest noise pick-up. I have seen cases where a move of just 20 feet can make a big difference in the noise level. As with all antennas, you should try to mount active antennas in the clear, away from metallic obstructions.

❖ Pierre, SD, Beacon?

Al Lundy (n0ime@hotmail.com) would like to know if anyone remembers a beacon from Pierre, South Dakota, that was on the air in the early 1960s, and possibly beyond. Specifically, he would like to know the frequency of this station.

Al heard it on a crystal set he built back when he was 11 or 12. He’d like to satisfy his curiosity now about what frequency he was actually listening to. The beacon ID may have been PIR, or something similar. If you have any ideas, please drop Al an e-mail, and copy me so we can share it with other readers.

This must be the month for Midwest correspondence, as we have another question from Warren Voorhees in Columbus, Nebraska. Warren is re-entering the DX-ing game after a hiatus, and asks what stations near him would be good targets.

Initially, you can just do a “scan” of the band to find out which stations are active, but there are also online resources to help you. One resource is the website at <http://worldaerodata.com/>. It lists

over 40 non-directional beacons (NDBs) in Nebraska and that

should give you a good start. For a state listing, click on the Navoids link at the left side of the opening page, choose United States, and then, Nebraska. This will list all of the beacons for that state. I note that Columbus is quite close to Iowa, so it might be worth checking the listings for that state, as well. Good luck, and let us know what you are hearing. We receive very few loggings from the Midwestern states and they would be a welcome addition to the column.

❖ Loggings

Loggings this month are provided by Mike Blazek (LA) and Pierre Thomson (NY). Mike uses a NRD-525 receiver with an RF Systems GMDSS vertical antenna. Pierre uses an Icom IC-751A Transceiver and a random wire antenna. Thanks to both of you for your contributions. Late summer is definitely *not* a time to hang up the headphones, as your loggings show!



TABLE 1. SELECTED LF LOGGINGS

FRQ	ID	ST/PR/ITU	CITY	Date/Time	BY
206	GLS	TX	Galveston	7/12 0327	M.B. (LA)
206	QI	NS	Yarmouth	8/13 0148	P.T. (NY)
212	HS	MS	Bay St. Louis	7/14 0310	M.B. (LA)
216	CLB	NC	Wilmington	8/05 0346	M.B. (LA)
245	PTN	LA	Patterson	7/12 0321	M.B. (LA)
248	UL	QC	Montreal-Dorval	8/13 0136	P.T. (NY)
260	AVZ	TX	Terrell	4/19 0322	M.B. (LA)
263	ECY	LA	Eunice	7/12 0312	M.B. (LA)
269	AR	LA	New Iberia	7/12 0132	M.B. (LA)
272	YQA	ON	Muskoka	8/13 0131	P.T. (NY)
284	BT	LA	Baton Rouge	7/11 0330	M.B. (LA)
289	YLQ	QC	La Tuque	8/13 0137	P.T. (NY)
303	YPP	QC	Parent	8/13 0146	P.T. (NY)
326	FC	NB	Fredericton	8/13 0145	P.T. (NY)
332	FIS	FL	Key West	7/14 0340	M.B. (LA)
334	YSH	ON	Smiths Falls	8/13 0150	P.T. (NY)
334	ZIY	CYM	Grand Cayman	4/20 0357	M.B. (LA)
335	YLD	ON	Chapleau	8/13 0144	P.T. (NY)
338	MS	LA	New Orleans	7/14 0405	M.B. (LA)
340	YY	QC	Mont Joli	8/13 0138	P.T. (NY)
347	MKV	LA	Marksville	7/13 0325	M.B. (LA)
350	DF	NF	Deer Lake	8/13 0151	P.T. (NY)
360	PN	QC	Port Menier	8/13 0143	P.T. (NY)
366	YMW	QC	Maniwaki	8/13 0129	P.T. (NY)
368	ZYZ	ON	Queensway	8/13 0158	P.T. (NY)
377	YRR	ON	Greely	8/13 0157	P.T. (NY)
378	RJ	QC	Roberval	8/13 0156	P.T. (NY)
388	AM	FL	Tampa	8/11 0522	M.B. (LA)
391	3B	ON	Brockville	8/13 0153	P.T. (NY)
392	ML	QC	Charlevoix	8/13 0139	P.T. (NY)
397	BWK	LA	Bunkie	5/01 0130	M.B. (LA)
407	ZHU	QC	Hauts Bois	8/13 0154	P.T. (NY)
426	FTP	AL	Fort Payne	8/11 0505	M.B. (LA)

Halloween a Major Pirate Holiday

Veteran pirate radio chasers are well aware that the volume of pirate broadcasts always increases substantially around holidays. While Halloween is not a major holiday for civil purposes, it has always been one of the biggest pirate radio holidays of the year. Therefore, at the end of October, it is a very good idea to check out the pirate bands.

The activity varies between stations activated for the occasion, notably broadcasters such as the **Voice of the Purple Pumpkin** and **Happy Halloween**, and other shows produced by stations that are active continually during the year. Many pirates produce special programs for broadcast around Halloween.

So, if you can tear yourself away from the trick-or-treat action, there are few better times during the year to hear a shortwave pirate transmission than on Halloween.

❖ Commander Bunny Runs for President

Commander Bunny, the leader of the Rodent Freedom Fighters on **WBNY**, has announced that he has decided to run for President of the United States. As you see here this month, he has prepared campaign paraphernalia such as bumper stickers. He already has a campaign slogan, which is, "We already elected a bush and a shrub, so why not elect a bunny?"



It is unclear whether Commander Bunny has decided from which political party he will run for President, but none of the major national polls are detecting any statistical support for his bid.

❖ Oldest Pirate QSL?

Adrian Peterson at **Adventist World Radio** provides new information during our continuing search for the oldest pirate QSL in the possession of *MT* readers. Within the large collection of AWR historic shortwave memorabilia, there is a March 6, 1927, QSL from Australian station **CBZ**. Their slogan was that they were "the black pirate." The card is signed by R. L. Knight. In those early days of radio development, licensing procedures were still variable around the world. But, a good case can be made that **CBZ** have been among the first pirate radio stations

in history. They claimed to broadcast from hundreds of miles south of Brisbane, but the statute of limitations has certainly run out on this one by now, and that location may or may not have been true 80 years ago.

❖ North Korean Quasi-Clandestine

A new quasi-clandestine station known as **Furusato no Kaze**, translating as "Wind of the Hometown" is being broadcast by Japan (although not from Japan) with programming attempting to pressure North Korea to return Japanese citizens that the government claims were kidnapped by North Korea. On *DXplorer*, Wolfgang Bueschel reports that their schedule is 1600-1630 UTC on 8780 kHz and 1700-1730 UTC on 9820 kHz from a transmitter in Taiwan. This one has been heard from parts of North America. On *DXplorer*, Wendel Craighead reported that the station does reply to e-mails, but that they do not issue QSL cards.

❖ Harry Potter on Pirate Radio

Several DXers have pointed out that once the dust settled from all the hoopla regarding the new Harry Potter book, many have noticed that pirate radio plays a role in the plot of this best selling book. Once you have the book in hand, the place to check is on pages 393, 437-444, and 578.

❖ What We Are Hearing

Monitoring Times readers heard two dozen different pirate radio stations once again this month, despite high static levels associated with summer heat waves. You can hear them, too, if you use some simple techniques. Pirate radio stations never use regularly announced schedules, but shortwave pirate broadcasting increases noticeably on weekends and major holidays. You sometimes have to tune your dial up and down through the pirate radio band to find the stations, but more than 95% of all North American shortwave pirate broadcasts are heard on **6925 kHz**, plus or minus 30 or 40 kHz.

Captain Morgan- Their rock music and audio from the old *Twilight Zone* TV show is easy to spot when they are active. (None, says to send loggings to the Free Radio Network web site)

Chicken Radio- This new station features saturation coverage of chickens, with the "Chicken Dance" song and other material related to chickens. (None)

4Q Radio- This new one appeared with a slightly

different ID than we show here. Their regular identification is not fit to print in a family magazine. (None announced)

Kracker Radio- The station confirms the spelling of their name, which had been reported with variable spellings by DXers in the past. They still program rock music, and they have been active lately. (Belfast)

Long Range Radio- This relative newcomer broadcasts comedy material and parody ads. Among their sponsors is the RU-469 contraceptive method. (None)

MAC Shortwave- If you liked rock and pop music of the 1960s, you will like Paul Star's replica of the old top 40 format. He still uses variable frequencies such as 3275, 6850, and 6925 kHz. (Uses macshortwave@yahoo.com e-mail)

Mind Bitch Radio- This new one is among the very few pirate stations with a country music format. (None announced)

Pirate Radio Boston- This veteran pirate normally programs rock music by local New England artists. (Uses pirateradioboston@yahoo.com e-mail)

Radio Free Euphoria- The veteran Captain Ganja's marijuana advocacy station has been more active lately. Rock music and comedy match his advocacy theme. (Belfast)

Radio Ice Cream- The Ice Cream Man mixes rock music with excited conversations by children who are delighted that they are receiving ice cream. (Belfast)

Radio Is My Friend; My Friend is Radio- This strange pirate tells a story about Graham Conner, an unfortunate inmate at the Cherokee Mental Asylum in Iowa. (None announced)

Radio Jamba International- Their novelty tunes and news parodies continue to be sprinkled with references to Kracker Radio. (Belfast)

Radio Moshiah & Redemption- Also sometimes known as Lubivitcher Radio, this ultraconservative Jewish religious pirate showed up again this month on 1710 kHz. Their web site at www.radiomoshiah.org/, still announces future plans for shortwave, FM, and "other broadcast methods." (None announced, but the web site accepts financial donations)

Sunshine Radio- The female announcer on this classic rock music station makes it clear that her station is affiliated with **Grasscutter Radio**. (Uses sunshineradio@yahoo.com e-mail)

Sycko Radio- This one has returned with pirate commentary and sketches from Beavis and Butthead. The news is that Bryan Wade has confirmed their e-mail address and the spelling of the station name. They have been occasionally heard using a **WSKO** call letter identification. (Uses syckoradio@yahoo.com e-mail)

The Crystal Ship- "Voice of the Blue States Republic" with The Poet features rock music and left wing political commentary. They use many frequencies including 1710, 3346, 3275, 5386, 6875, 6925, 7576, and 9057 kHz. The station indicates that 6875 kHz is their primary frequency, with others in occasional use. (Belfast and uses tcshortwave@yahoo.com e-mail)

Undercover Radio- "From the middle of nowhere," Dr. Benway tells stories and programs rock music shows. (Merlin and uses undercoverradio@mail.com e-mail)

Voice of Captain Ron Shortwave- A mailbag program sometimes is added to this rock music pirate.

Continued on page 61

Emergency "What If" Thinking

As those of you who have followed my writings over the years know, I spent a lot of time doing emergency service work both as a ham and as an Emergency Medical Technician (EMT). More recently, I have taken my skill set over to a new effort, assisting with the National Canoe Safety Patrol on the Delaware River. Attending the monthly training sessions reminded me, once again, of the time honored, "What if" scenario.

I was thinking about this model when I ran across some scenes related to the more serious weather that has occurred this summer around the country. One particular image caught me up short. It was a flooded-out property where a ham radio operator's tri-bander and tower had gone over and was now little more than a pile of scrap aluminum.

It shouldn't be too hard to think of situations that might bring your antennas down in bad weather. Wind, tree branches, flooding, ice, and even plain old metal fatigue under hard conditions, can all result in an antenna system that is out of commission at the very time and place you may need to put your radios to work to do something other than adding Radio Freedom to your Honor Roll listings.

❖ Playing "What if"...

It is late fall. An unusually early but still very severe wind and ice storm hits your area. Power is knocked out for most of your county. The county was still waiting on its winter salt supply so what little they have on hand has already been put to limited use. A quick listen to your battery powered scanner reveals that the police are busy pulling people out of ditches and the fire departments are providing emergency power support to hospitals and nursing facilities. The EMTs have been pulled back to the hospitals to support the overflowing emergency rooms.

The local AM broadcast station is telling everybody to boil their water and batten down. Officials are warning all non-essential personnel to stay home because it looks like Mother Nature is going to swing this thing around and hammer the area again in about 12 hours. The Governor has activated the National Guard to enforce the travel rules. Hardwire phones are out, as are most cell phones.

You have a small generator and enough gas for a couple of days (plus whatever you can siphon out of your cars). You are an average ham with basic 2 meter and General Class HF capabilities. You have taken good personal safety precautions for you and your family so you can

sit down and put your radios to work helping out....

...That is, you could, but the ice took down your all band dipole, and that rusty old TV mast you put your 2 meter antenna on gave up the ghost and dropped your VHF ground plane point first into the vinyl liner of the family pool. (Wait until you explain that one to the insurance company!)

Get the picture? Radio-wise you are up that well known creek and your paddle went downstream a hundred yards ahead of you.

Now at this point, some folks would just shrug their shoulders, put another log on the fire and read back issues of *CQ* until the weather broke. But not you, Bunkey! You are made of tougher stuff than that. You know that helping folks with your radios is the rent all hams pay for access to the airwaves. So let's get going!

❖ Using the old noggin

Okay, first things first. There is an adage in rescue work: "Slow is fast." If you are a loyal member of F.I.S.T.S you have heard a similar thing said about using CW: "Accuracy Transcends Speed." Keep these in mind. If you use the first few minutes to simply assess the situation you find yourself in, you will save yourself a lot of work and maybe even save your skin.

First and foremost, is it safe to do anything about your lack of antennas? We are talking cold, wind, ice, etc. Do you have the clothing, physical strength and ability to even leave your house to assess what is going on outside? This is no time for someone with a preexisting medical condition to fall out trying to shovel their way to their dipole or tower. Remember, even if an EMT Team is back on the road, they are going to be a long time getting to you and most of us still don't have defibrillation units in our houses.

Next is the mantra of any modern rescue worker. It applies to everyone. "Scene Safety... Scene Safety... Scene Safety!" If you see anything that might put you in danger, stay clear. Downed power lines, broken water mains, standing water where you cannot determine the depth, even ice covered trees that may come down on your noggin at any moment. Open your eyes, your ears, and even your nose. Do you smell gas or other possibly dangerous substances?

Okay, let's say you are healthy, happy, warm and dry. You check the surroundings out and it is safe for you

to wander your back yard to see how bad things are. Back to the scenario.

Right now there is nothing you can do about the hole in the pool or the 2 meter antenna that made it. That is for after the event is over; maybe even until spring at this point. The dipole's ground side wire broke at the center insulator. The section connected to the center conductor of the ladder line is still attached to a tree, but dangling out of easy reach. The other section is still attached to the center conductor and its far end support. The ladder line still looks good all the way back into the house. Not too bad, considering. Let's see what we can do with this.

Let's assume the batteries in your 2 meter handi-talkie are charged. Go back in the house to the highest point and see what you can do with the rubber duckie antenna. See if you can hear or work any area repeater systems. I know I have talked about a lot of quiet repeaters in past columns, but I think emergencies bring out the best in people. Even if you are at marginal range for repeaters, switch your rig to 146.52, the National Simplex Calling Frequency and see if you can get out. Chances are, in an emergency situation, more than a few hams in surrounding counties will be aware of what is going on and will have turned their beams toward the area under emergency. Let the gain of their antennas do the work and see if you can get contact established.

❖ Situation Shift

Change up... Suppose you forgot to charge up your talkie. Time to stop and think again. Got a rig in the car? If you can get to it, apply the same scenario as above, with the following conditions. Do not turn on the car's engine at this point. Right now you may need that gasoline for your generator. If the car rig is going to be your



Your humble columnist up the creek but still holding his paddle.

way to talk to the world for awhile, you are going to have to ration its use and the use of any fuel to keep the radio (and maybe the generator) running as long as possible. So remember... Slow is fast. Take the time to first try the rig in the low power position. If you can establish good contact that way, you are going to operate for a longer time than if you have to turn up the wick.

I would guess that, for 90% of the folks reading this column, either of the above attempts to raise the world on 2 meters will get you in touch with someone who can then reach out to the rest of the world. If you encounter an active emergency net, follow the directions of the net control. Be sure to inform them that you are IN the emergency and not in a position to AIDE in the emergency at this time. Inform net control of immediate emergency situations in your area. For example, you know the older woman living next door has health problems that may warrant some action by emergency services. Inform net control of your ability to participate and the limitations of your station at this time.

❖ Change-up #2

Okay let's change things up again... You live outside of town on a farm. Your 2 meter coverage is marginal in the best of conditions, but let's say that you don't even have that. Your next step is to think about using your HF gear to get out to the world. Unless you are a dedicated "off the grid" QRPer, you are going to have to first weigh your ability to power your rig against the need to keep your family and yourself safe for the duration of the emergency. How much generator fuel are you going to feel comfortable giving to the cause at the time? You really want to think this through before you do anything else. If you have no immediate needs and you have established a safe comfort zone for you and yours, it is perfectly okay to just sit down and shut up.

But let's say you have decided that you really want to let someone know about your situation and the situation of that little old lady next door. Time to try to fire up the HF rig. Now, what I am about to tell you is going to fly in the face of most of the antenna books you have ever read. Dedicated readers of *Radio World's* Kurt N. Sterba will probably want to take some motion sickness medicine before going on; things are going to get a bit wavy.

Remember... You are in an emergency situation. You aren't trying to contact Nibi Nibi. You want to get a few watts down the wire and reach folks in the next county, not the next hemisphere.

Remembering the state of your HF antenna, as well as the state of the deteriorating weather, you don't have a lot of time to get fancy here. Time is not on your side. But slow is still fast. You know the ladder line and one leg of the dipole are intact. The first thing to try is to get the center insulator and the single leg tied off as high as you can off the ground. It may only be a few feet, but do your best. Fire up your rig and see if you can hear anything on any of the bands. Since you are using ladder line, you have a tuner in the circuit. You will find this works best by adjusting the tuner to the loudest audio you can hear. Even with half a dipole barely up

in the air, you should be able to identify local and regional contacts.

Continue to do this as long as you feel you can spare the power and until you identify a signal that is pertinent to your emergency situation. Zero beat the signal and now (at reduced power... eg. 25 watts on a 100 watt rig) try to load the antenna and transmit. Basically, what I am asking you to do is turn your broken half wave dipole into a quarter wave antenna working against a fairly lousy ground. You're not going to win Sweepstakes, but this should put a signal into the next county. If you get a good load at reasonable SWR (2.5 to 1 or better), you may even want to crank up the power a bit. If you have time before the second storm hits, you may try to improve upon things by cutting a piece of wire to recreate the second leg of the dipole. You may not be able to get it up very high, but it should still help make things a little better in a bad situation. Don't bother with a soldering iron. It's too cold outside. Just wrap and run.

Follow the directions about establishing contact with a net as mentioned above. No net? No problem! Just tell whoever you can contact you are in a tough spot and ask them to get hold of the authorities. No contacts? Try calling CQ EMERGENCY on known active local hangouts. Don't forget that you may be fighting propagation even over short distances with a marginal antenna. You may have to wait a few hours to try again. Don't waste fuel if the bands won't work with you.

❖ Customize your scenario

You know your part of the country and the likely tough stuff you may face. Get on your local repeater and get a conversation going about local "What If" scenarios...before you need them.

Have fun! I'll see you on the bottom end of 40 meters.

UNCLE SKIP'S CONTEST CALENDAR

YLRL Anniversary Party (CW)
Oct 2, 1400 UTC - Oct 4, 0200 UTC

California QSO Party
Oct 6, 1600 UTC - Oct 7, 2200 UTC

RSGB 21/28 MHZ Contest
Oct 7, 0700 - 1900 UTC

YLRL Anniversary Party (SSB)
Oct 9, 1400 UTC - Oct 11, 0200 UTC

FISTS Fall Sprint
Oct 13, 1700 - 2100 UTC

Pennsylvania QSO Party
Oct 13, 1600 UTC - Oct 14, 2200 UTC

School Club Roundup
Oct 15, 1300 UTC - Oct 19, 2359 UTC

CQ Worldwide DX Contest SSB
Oct 27, 0000 UTC - Oct 28, 2400 UTC

10-10 Int. Fall Contest CW
Oct 27, 0001 UTC - Oct 28, 2359 UTC

Outer Limits continued from Page 59

(Uses captainron6955@hotmail.com e-mail, and this replaces a former and now invalid address)

Voice of Laryngitis- Many pirate DXers consider this one to be the source of the best pirate programs that have ever been produced. The Huxley Family Players have been showing up lately via relays of their classic shows. (Belfast)

WBNY- Commander Bunny's parody of clandestine stations has shifted focus dramatically. As we see here this month, he has tossed his hat into the ring as a candidate for President of the United States. He promises election material in reply to reception reports sent in. (Belfast)

WHJR- Little is known about this one, other than the fact that they regularly play the song, "Hey Joe," with a format of "All Joe, All the Time." (None)

WMPR- Their techno rock "dance music" is usually broadcast in upper sideband mode. But, lately, they have also acquired an AM transmitter. (None, QSLs only rarely at the Kulpville Winter Shortwave Listeners Festival).

Wolverine Radio- This new one programs classic rock music with parody ads and frequent identifications. (Still Unknown)

WSKO- Early speculation is that this may be new call letters for Psycho Radio, who has returned with rock music. Sometimes they use 6875 kHz in lieu of 6925 kHz. (Uses syckradio@yahoo.com e-mail)

❖ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14895; PO Box 109, Blue Ridge Summit, PA 17214; PO Box 146, Stoneham, MA 02180; Casilla 159, Santiago 14, Chile; and PO Box 293, Merlin, Ontario N0P 1W0. Unfortunately, PO Box 69, Elkhorn, NE 68022 is announced as no longer valid address, although a few pirates announce it, and some claim to still be getting replies through it.

Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletin for submitting pirate loggings with a hope that pirates might QSL is now the e-mailed Free Radio Weekly newsletter, still free to contributors via Elnsinge@vrzus.JNJ.com. A few pirates will sometimes QSL reports left on the outstanding Free Radio Network web site, at <http://www.frn.net>.

❖ Thanks

Your loggings and news about unlicensed broadcasting stations are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: Skip Arey, Beverly, NJ; John T. Arthur, Belfast, NY; Kirk Baxter, North Canton, OH; Jerry Berg, Lexington, MA; Wendel Craighead, Prairie Village, KS; Richard Cuff, Allentown, PA; Gerry Dexter, Lake Geneva, WI; Rich D'Angelo, Wyomissing, PA; Bill Finn, Philadelphia, PA; Harold Frodge, Midland, MI; William T. Hassig, Mt. Prospect, IL; Harry Helms, Smithville, TX; Ed Insinger, Summit, NJ; Ed Kusalik, Coaldale, Alberta; Chris Lobdell, Tewksbury, MA; Greg Majewski, Oakdale, CT; A. J. Michaels, Blue Ridge Summit, PA; Adrian Peterson, Indianapolis, IN; John Poet, Belfast, NY; Chuck Rippel, Chesapeake, VA; Jim Ronda, Tulsa, OK; Martin Schoech, Eisenach, Germany; and Bryan Wade, Elizabethtown, KY.

Antenna Designs for VHF, UHF and Microwave

This month we'll be discussing antennas for "higher frequencies." For our discussion, these "higher frequencies" are the frequencies above 30 MHz. So this month, when we mention "lower frequencies," we are referring to frequencies below 30 MHz: the HF (shortwave) band and lower.

Compared to the lower frequencies, the even shorter wavelengths of very high frequency signals can allow dramatic reductions in antenna size. This is particularly true at UHF (ultra-high frequencies) and microwave frequencies. A half-wavelength antenna element designed for 3 MHz in the HF band is over 150 ft long. However, at 30 MHz that element would be about 15 ft long; at 300 MHz, around 1.5 ft; and at 3 GHz in the microwave band the same element would be less than 2 inches long!

The smaller size of the higher-frequency antennas means that, in general, they capture less energy from passing waves than do the larger, lower-frequency antennas of the same design. On the other hand, their smaller size makes it quite reasonable to construct more directive, higher-gain antennas than is practical at the lower frequencies.

Antennas at the lower frequencies can support world-wide communication via sky waves, and even by ground waves at the lower end of the spectrum. However, unless repeaters or communication satellites are used, communication on the upper frequencies is typically limited to what is called the "line-of-sight"

between a transmitting antenna and a receiving antenna. A line-of-sight communication path must be free of obstructions such as hills, and stops a bit beyond our visual horizon. For maximum communication distance in line-of-sight work, mounting the antenna as high as is practical is usually desirable. (Check the line-of-sight web sites in the box for more on this.)

Probably the most popular non-directional antennas at the higher frequencies are the various versions of the ground-plane design. Vertical half-wavelength dipoles are also utilized at these higher frequencies. Vertical half-wavelength folded-dipoles are sometimes arrayed around a metal mast such that their combined patterns produce a non-directional radiation-reception pattern exhibiting some gain over a simple dipole. The gain is due to the mast serving as a reflector.

J-antennas, a type of end-fed vertical dipole, are also utilized at the higher frequencies. Wide-band, non-directional antennas, such as the discone, and bi-conical horn (fig. 1A) find frequent application at the higher frequencies.

Slot antennas are slots in a metal sheet where the area of the sheet is much larger than that of the slot. They are particularly adaptable to applications such as the metal skin of aircraft.

The whips and rubber duck antennas, used with hand-held transceivers and scanners,

are non-directional by design. However, in practice, they are typically, but unintentionally immersed in an environment that includes conductive objects, including the radio operator's body. Thus their patterns are no longer fully non-directional. These antennas are usually very low-gain designs, although variations such as the tiger-tail, quarter-wavelength, half-wavelength and the 5/8-wavelength designs provide some gain.

Patch or microstrip antennas (fig. B) are common today at the higher frequencies. These antennas consist of a metal plate separated from a metal ground plane by dielectric (insulating) material. At UHF or higher they can be quite small, and are common in hand-held devices such as GPS receivers, as well as cell phone booster antennas, and LAN antennas.

The Yagi-Uda and the log-periodic dipole array (LPDA) beams are beam antennas quite common on the VHF-UHF bands. Less common are the cubical-quad and the quagi: a design combining elements of the quad and the Yagi-Uda.

At microwave frequencies, directivity is often obtained by using reflectors such as a metal sheet or metal dish to direct waves to or from a small feed antenna. A "feed antenna" directs signal energy to (receiving) and from (transmitting) the antenna's feed line or waveguide. The feed antenna might be a dipole; Yagi, flared, open-end waveguide antenna; or other type antenna. Antennas utilizing such reflector designs include the panel, trough, corner, axial-mode helical, and the parabolic dish (fig. 1C).

For the dish antenna, a feed antenna is placed at a parabolic reflector's focal point; however, in this position the feed antenna blocks some of the incoming and outgoing signal. Constructing the reflector as only a portion of a larger parabolic surface, allows off-center placement of the feeder and avoids such signal blocking (fig. 1D). The cassegrain reflector allows positioning the feeder away from the focal point. This design is utilized where large feed systems with low-noise pre-amplifiers make positioning the feeder at the focal point complicated or unwieldy.

Horn antennas are useful at microwave frequencies. The simplest horn consists of simply flaring the end of the antenna's waveguide into a horn or funnel shape. The Hog-horn, or cornucopia (fig. 1E), is a high-gain microwave beam antenna. This horn antenna is basically an off-center fed section of a parabolic reflector which reflects radio waves into or out of a horn

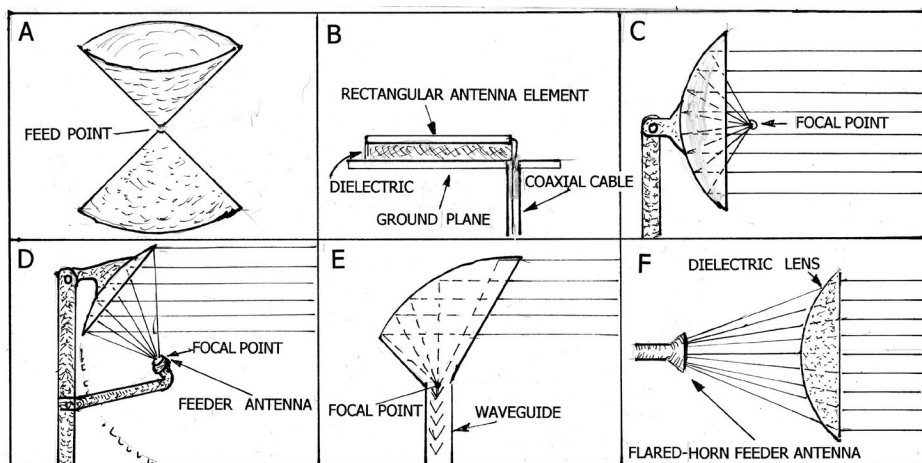


Fig. 1. A biconical antenna (A), a microstrip patch antenna with coaxial feed line (B), a parabolic-reflector with lines showing the path of radio waves it utilizes (C), an off-center fed parabolic-section antenna with non-obstructive feeder antenna (D), a Hoghorn feeding a waveguide (E), and a dielectric lens feeding a simple, flared-waveguide, horn feeder antenna (F).

This Month's Interesting Antenna-Related Web site:

These first two sites show photos of various higher-frequency antennas:

www.de220.com/Electronics/Antennas/Antennas.htm
www.de220.com/Electronics/Antennas/Antenna%20Photos/

An excellent microwave-antenna handbook:
www.w1ghz.org/antbook/contents.htm

A guide to understanding radio line of sight:
www.fab-corp.com/pages.php?pageid=2

feeding the end of a waveguide. In this antenna the signal path (except for the wave's enter-exit opening) is shielded by the metal construction of the horn. The gain of the reflector antennas discussed above is generally high.

Less popular than the reflectors or horns are the lens antennas (fig. 1F). In lens antennas the signal is focused to a feed antenna, either through spacings between lens-shaped, parallel metal sheets, or through lenses made from dielectric material.

❖ In Conclusion:

We have discussed a variety of antenna designs employed at the higher frequencies. However, looking through a comprehensive antenna-engineering handbook will reveal a many other designs available for use on these frequencies. In addition, we should keep in mind that essentially any antenna used at the lower frequencies can be scaled down to function on the higher frequencies.

For instance, the quarter-wavelength, earth-grounded Marconi antenna is adapted

RADIO RIDDLES

Last Month:

I asked: "The FSM (field-strength meter) described above is essentially a crystal-set receiver. If so, then how is the FSM of fig. 1 different from an ordinary crystal-set receiver we might use to listen to radio programs, and what would it take to make it into such a receiver?"

Well, obviously the meter would be replaced by headphones. And, unless you have only one AM station in your area, you will need to replace the resistor at the antenna with a tuning circuit to separate the received signals from one another. Also, unless you live near the station you want to receive, you will need a reasonably long outdoor antenna and a ground connection attached at the bottom of the antenna resistor, or tuning circuit. With those modifica-

tions your FSM would become a crystal-set, AM receiver.

After returning from World-War Two, my brother Bill told me that the soldiers overseas sometimes made "fox-hole radios" to listen to local nearby radio stations (sometimes propaganda stations run by the enemy, I suppose). These were "crystal" sets with only a coil of wire, scrounged earphones, and an old-fashioned, crystalline, blue-steel razor blade as the crystal! Check one out at: <http://members.aol.com/djadamson7/articles/foxhole.html>

This Month:

What kind of radio antenna is designed so that it neither transmits nor receives? And why would we even want such an antenna?

You'll find an answer to this month's riddle, another riddle, another antenna-related web site or so, and much more, in next month's issue of *Monitoring Times*. 'Til then, Peace, DX, and 73.

to higher frequencies by using the metal top of automotive vehicles in place of the earth. As another example, scaled-down versions of rhombic and V wire antennas, ordinarily used on HF and lower frequencies, are sometimes employed in remote areas for UHF-VHF TV broadcast reception.

But even with such a wide range of choices, the field of antenna design continues to evolve, and new designs are constantly being developed.

On the Light Side

Freakie Freddy is an avid radio nut and DXer. He is always twiddling with his receiver's dials. Try repeating the following description of his behavior four times rapidly: "Freakie Freddy of Freiburg fervently changes frequency frequently." Be a brave radioist, and do it without looking at the printed sentence.

Let's Make a Deal!

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The BC-348 Gets a Smoke Test

One of the things we accomplished last month was to install the connections that would be needed to bring power into the BC-348. This month, we'll make use of them to apply the power and give the radio a "smoke test." But first, all of the control knobs, which had been removed earlier in the restoration, needed to be cleaned, touched up, and reinstalled.

The knobs were placed in a small plastic container and swirled around in a dilute solution of laundry detergent. After a few minutes of this, the solution took on a very satisfying dark gray hue. Though quite a bit of grime had obviously been removed by this tactic, I found an old tooth brush and worked on all the nooks and crannies with more of the solution.

After rinsing with warm water and drying with a paper towel, the knobs were ready for a little touch-up to cover spots where paint had chipped, revealing bare aluminum. For this I resorted to the BIC "Mark-It" permanent marker pen that had been very effective on the front panel. Marker fixes are obviously much more convenient than dealing with paint, and the marker ink – being basically dye – doesn't have an obvious heavy texture.

Replacing the knobs was a simple enough procedure, but one that occasionally required some strategy. Several of the knobs were in positions such that there was limited clearance to swing the Allen wrench needed to tighten the setscrews.

For these knobs, I was careful to tighten the screws as much as possible *before* installation – leaving them just loose enough so that the knobs would slip over their shafts. That way, there would need to be only a minimum of further tightening once a knob was in place. I also seated the wrench properly before slipping a knob on its shaft so at least the first swing

could be done without having to search for the setscrew from an awkward position.

❖ The Smoke Test

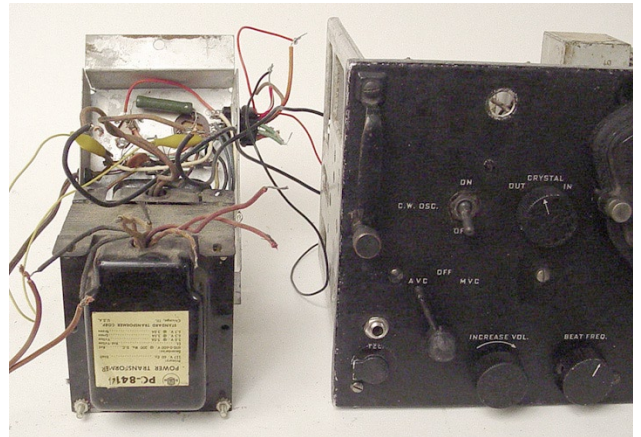
We were now fast approaching the event that the past several columns had been leading up to: powering up the radio for the first time in who-knows-how-many years to see what would happen. For this purpose I had my eye on a neat little power supply salvaged from a '60s-era console several years ago. It was unusual in being a separate unit – mounted in the speaker area of the set – rather than an integral part of the radio chassis.

It would be perfect, I thought, as an external supply for the BC-348. It was even equipped with a convenient socket and plug with extra contacts set up for a remote on-off switch. Powering up the unit slowly on a Variac, I found that the high-voltage circuit was in good order, delivering a robust 300 volts. But it turned out that the filaments of the original radio had run on 12.6 volts rather than the 6.3 volts I had expected.

I would have to put this little supply away for some future use, but as a matter of convenience I decided to leave it on the variac to supply temporary high voltage for testing the BC-348. I found a separate transformer to provide the needed 6.3 volts for the filaments.

I connected the filament circuit first – through an a.c. ammeter to make sure that the current draw was close to the expected two and a half amperes. Since the filaments – originally in series/parallel for 24-volt operation – had been rewired by a previous owner for individual 6.3-volt feed, this would be a good indicator of whether all tubes were lighting properly. It would be hard to determine this visually, since most of the tubes are metal.

The ammeter reading checked out and, after several minutes, all



Temporary lashup for test-powering the BC-348. Meters and variac (see text) not shown.

tubes were warm to the touch. It was time to plug in my World War II era headphones and apply the high voltage. I connected the power supply, along with meters to monitor voltage and current (the latter to warn me of any abnormal drain caused by a short circuit), and slowly advanced the Variac until I reached the 250 volts required by the receiver.

The current remained within reasonable limits, reaching up to about 100 mA at certain control settings. And I'm happy to say that *no* smoke was observed. I wish I could now tell my readers that the receiver had immediately come to life at this point. Nine times out of ten, with careful preparatory housekeeping and recapping, that is exactly what would happen. But not this time!

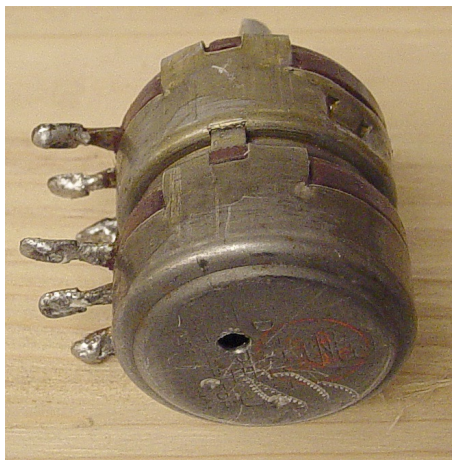
I wasn't surprised. This is a complicated radio to work on and troubleshoot. And I had not only my own possible mistakes to worry about, but those perhaps yet undiscovered that might have been perpetrated by previous owners. What I did hear was...nothing...except for a muted a.c. hum. Then I realized that I had the mvc-off-avc switch in the "off" position.

Switching over to "avc," I did hear what sounded like atmospheric static crashes – which was encouraging. However, the receiver was unresponsive to screwdriver-scratching of the antenna post or any of the r.f. or i.f. grid caps – nor was the noise affected in any way by moving the bandswitch. Results in the "mvc" position were similar.

❖ Cleaning the Volume Control



With knobs installed, front panel is now virtually complete. Hole at upper left, made by previous owner for a fuse, may eventually accommodate a fuse holder or a send/receive switch.



Hole drilled in rear potentiometer of the volume control made it possible to inject a shot of control cleaner.

The old girl was essentially dead except for the static crashes, which were apparently being internally generated somewhere. The volume control didn't have much effect on that noise – but generated ear-splitting static of its own every time it was moved. To save my ears, I decided that the next move would be to clean the volume control contacts.

The volume control is a dual potentiometer. The rear unit functions only in the "avc" position and controls the audio level to the output tube. The front unit functions only in the "mvc" position and is an r.f. gain control, operating on the r.f. amplifier tubes and the first and second i.f. amplifier tubes.

To accomplish the cleaning, I'd have to remove this dual pot, first disconnecting the six wires and making careful note of which terminals they belonged on. Once that was done, I could see that there were no openings into which I could squirt control cleaner fluid. I'd have to do some disassembly.

The front resistance element was easily released from its shell by bending up the retaining tabs. And I could see that the wiper arm had a little protrusion that engaged a notch in an assembly at the bottom of the shell. This, obviously, is how the wiper arm of the rear potentiometer was rotated along with that of the front one. I made careful note not to move either arm while the units were separated in case it might be difficult, later, to find the "sweet spot" where they locked together.

The tabs on the rear element were not easily accessible – being covered by the shell of the front element, which was still in place on the rear assembly. My only option was to do something I had read about but never tried, namely to drill an access hole in the rear cover that would be big enough to accommodate the nozzle of the "straw" on my pressure can of control cleaner.

Previous disastrous experience in similar situations had taught me that there would be no way I would be able control the travel of the drill bit after it had broken through the thin metal. So this time I played it smart and first used the bit to drill a hole through a piece of scrap 2 X 4. Then I adjusted the position of the bit in the drill chuck so that the tip just cleared the bottom of the block.

Doggone those keyless chucks! In use, the bit kept pushing itself back into the chuck just enough to prevent the tip from going all the way through the metal. But the last thing I wanted to do was to destroy this control, so I was very patient – advancing the tip just a tiny bit each time until I was rewarded with a very nice round hole in the back of the rear cover – and *only* in the back of the cover.

Liberal squirting the exposed front element with control cleaner, I carefully inserted it back into the shell and refastened the tabs. Then, using the newly made opening in the back element, I inserted the nozzle of the control cleaner can and administered a healthy dose.

After working the control back and forth, several times, through its complete travel, I was ready to reinstall it. It was now much quieter, though there are still a few rough spots that I hope will take care of themselves with time. Before I close up this radio for good, I'll stick a square of plastic electrical tape over the hole.

❖ Next Steps

Having come this far, I really wanted to begin the troubleshooting process. But there were a couple of obstacles.

When troubleshooting, one must be able to reposition the set frequently in order to access various tube sockets and other diagnostic locations. But right now, the set is hooked up to a couple of different power sources using a number of temporary (and uninsulated) connections. Each move would require the rechecking and redoing of these connections – a tedious process that would also open the way for error.

And so, before doing any troubleshooting, I've decided to put together a permanent power supply for the radio. As mentioned, I had originally intended to use, externally, that neat little salvaged supply. But since it has turned out to be unsuitable, I'll shoot for building a permanent supply into the dynamotor well.

I also would like to avoid any further testing with earphones. The loud clicks and static crashes can be quite uncomfortable, if not painful! But the BC-348's audio output impedance (you can choose 300 or 4000 ohms) is not suitable for the usual 6-8 ohm speaker.

Some BC-348 "restorers" have decided that the set doesn't even have enough gain to operate a speaker. They have modified the radio by adding another stage of audio and replacing the original output transformer with a conventional one having a 6-8 ohm output.

However, knowledgeable folks assure me that there is more than enough gain. All that is needed to install a speaker is a salvaged conventional output transformer. Take it from almost any junker radio with a single-ended output stage – even an old a.c.-d.c. job.

First, make sure that the BC-348's output transformer is set for 4000 ohms. Then plug the primary of the output transformer into the BC-348's headphone jack and connect the secondary to the speaker. Actually, you may very well be able to salvage a speaker with the transformer already mounted on it and wired to it. The result: a speaker system with more than adequate volume and attached to the receiver without making any modifications.

To locate the trouble in this radio, I plan to start with the *signal substitution* method. Basically, one begins at the audio output stage – injecting an audio signal from a test generator. If that signal makes it to the speaker, one moves backwards, stage by stage, injecting appropriate signals (audio, modulated intermediate frequency or modulated radio frequency) into each one. The stage which does not pass the signal through to the speaker is the one that is in trouble.

The most direct way of trouble-shooting the defective stage, once found, is to begin by comparing the voltages at its tube terminals with the normal ones listed by the manufacturer. Large discrepancies will point the way to failed components. In some cases, including this one, the manufacturer will also have provided normal resistance readings from each terminal to ground. These will provide additional diagnostic information.

See you next month for the trouble-shooting session!

This month's reader's password is *arrrr* (you know... the sound a pirate makes!). To access this month's reader's only content, go to www.monitoringtimes.com and click on the reader key and use the username of *mreader* and the password *arrrr*.



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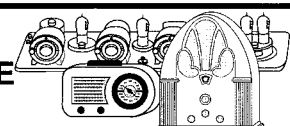
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The Radiosophy HD-100 Philosophy

By Ken Reitz

In April of this year, *MT* published an exclusive on-line preview of Radiosophy's HD-100 just prior to its introduction at the NAB convention in May. Since then, the product has undergone a few changes and a price reduction.

Two years ago, the company introduced a higher priced, multi-functional model called the Multistream HD, which gained a lot of attention and took top awards at the Consumer Electronics Show. But Radiosophy has been promoting this smaller, less ambitious and more attractively priced model, while it works on revamping the original Multistream HD. There may be more about the Multistream HD model next year.

❖ Stripped Down HD Radio

Until now HD Radio table-top sets were showoffs with tasty features piled up like toppings on a sundae. But, here comes Radiosophy's bare-bones, no frills, HD-100 which makes tuning into the future of AM and

FM radio as cheap as it gets.

Compared to the dressed-up table-top HD sets, the HD-100 looks a little anemic, but don't let that mislead you. It's still an effective HD receiver. It just doesn't have the built-in CD player, extraordinary audio, remote control, or other added features that run up the cost on the competition. That's because the heart of the HD-100 – the HD receiver chip-set and blue display – are virtually the same as used in all the other HD radios.

The question is: How does it play? As expected, the audio is not spectacular. The small 2.5" speakers won't amaze you with their slight-of-ear deception. But, its crisp, clean audio compares favorably, by my ears, to Radio Shack's Accurian HD radio.

How does it receive? Picking up AM HD signals is totally dependent on the AM HD signals available in your area. There are only a few where I live, and, with the aid of a tunable AM loop antenna, I can lock in one AM HD station. Unfortunately, it's an all-talk station, so the great audio fidelity of the iBiquity sys-

tem is wasted. A small non-tunable AM loop is provided and may help if you're in an urban or suburban location, but I found it of no use. Spring loaded antenna terminals are provided on the back of the radio for attaching the AM antenna. There are five AM station presets. Don't look for AM HD DX with this or any other model, as the digital signal won't hold together much past ground wave reception.

Tuning the FM band is far more interesting. The proliferation of FM HD stations nationwide and the increased use of supplemental channel broadcasting give listeners something to hope for. Here the HD-100 does rather well. This radio comes with a telescoping whip antenna for FM reception which, when removed, reveals a 75 ohm coax "F" connector to which an external FM antenna may be attached.

A common T-shaped folded dipole is packed with the radio but, like its AM counterpart, is useful mostly in urban or suburban locations. With the whip in place I could pick up only the closest HD radio station. But, with a rotatable, amplified, 10 element FM antenna, I was able to tune in a half dozen or more HD stations in all directions. The limit seemed to be about 50 miles for reliable HD reception. I could occasionally pick up HD stations 100 miles away when conditions were good, but such conditions were not reliable.

There is a mini-headphone jack on the front of the radio. When I plugged in a set of Bose headphones the audio was excellent: full bass response, great treble and gratifying channel separation. So, that got me to thinking. Why not plug the audio output from the headphone jack into my stereo as I would an MP3 player? Now I can use the HD-100 as an HD tuner and let the stereo do the heavy lifting in the audio department. This lets me keep my old, but great stereo and up-grade it to HD. It also gives me access to the second and third audio channels of HD stations and sound quality of HD radio without having to shell out the big bucks for a more capable receiver.

❖ HD-100's Other Features

The menu on the HD-100 allows changing the display from static to scrolling, setting the clock, and setting the "seek" mode to look for all stations or only HD stations. There is an "Aux" input which lets you play an MP3 player, portable CD player or the output of your computer's sound card for listening to Internet radio stations. Access to the Aux input is possible by pressing the "band" button until



Radiosophy's HD-100: It's small, it's cheap and it's a great way to get into HD Radio without spending a lot of money. (Courtesy: Radiosophy)

the display shows "aux in."

There are two LEDs on the front panel. The left-hand red LED indicates the receiver is picking up an analog stereo signal, while the right-hand blue LED indicates the receiver is picking up an HD Radio signal either on AM or FM. When the HD signal is detected the blue LED will start to blink. That means the receiver is decoding the digital signal. After the fourth blink, it will switch into HD mode and the audio will change from plain old analog stereo to HD stereo.

The difference on FM is remarkable. The audio sounds wide and full with a nearly live presence. On AM the HD audio will sound like analog FM, which is still nice to hear. If the blue LED continues to blink but does not lock on, it means that you're just slightly out of range for full HD reception. Try a better antenna. The red stereo LED remains lit even when you have locked onto an HD FM signal.

The backlit LCD display panel is small, but the contrast is good, making it easy to read.

MANUFACTURER SPECIFICATIONS

Tuning:

AM 530-1710 kHz in 10 kHz increments

FM 87.9-107.9 MHz in .2 MHz increments

Station Presets:

AM: 5

FM: 5

Dimensions:

6.5" H x 12" W x 3" D

Weight: 2 lbs. 12 oz. (without power supply)

3 lbs. 14 oz. (with power supply)

Antenna:

AM: Internal ferrite loop

External 300 Ohm spring terminals for use with AM passive loop (included) or AM tunable loop antenna (not included).

FM:

Telescoping whip 30" with "F" connector attached at the base. The antenna can be removed to expose an external 75 Ohm coax connector which can be attached to a folded dipole "T" antenna (included) or any external FM antenna terminated with a 75 Ohm fitting (not included).

Input:

Mini-plug AUX input on rear panel for MP3 player, external CD player or connected to the sound card of your computer for Internet audio.

Output:

Mini-plug 8 Ohm headphone jack. This jack may also be used to feed the HD audio into a stereo.

Features:

- Blue LCD Display: 2 line scrolling or static text
- LED: Red indicates analog stereo and Blue indicates a digital AM or FM signal.

The blue display is standard on all HD Radio sets and Radioscopy has managed to tame the brightness of the display so that when the unit is shut off it doesn't light up the room. But, the red and blue LEDs are so bright I actually found them annoying.

But, wait a minute! You'd expect a radio this small and cheap to really be a clock radio and so it is. You can program the radio to tune into commercial free channels (while *that* lasts) and wake you up in the morning. Sleepy, but want to listen to your favorite classical station while you drift off? Pressing the "sleep" button and "enter" lets you set the time for the radio to stay on from 1 to 120 minutes before it shuts itself off.

❖ Last Word

If you've not been following the HD Radio series in *MT* throughout the year, there are a few reception caveats of which you need to be aware. You should know that reception of HD Radio signals is much harder than it is with analog. If you're used to enjoying distant FM signals and putting up with a little hiss and fading, you should know that such weak stations will not be receivable in HD mode. All HD radios require a much more robust signal to decode the digital transmission.

If you can lock onto a secondary HD signal on an FM station whose signal fades, the channel will switch to the primary analog signal. When the signal comes back up, it switches to HD and you'll have to re-tune to go back to the second channel. If you want full time access to the secondary channel of a station that comes and goes, you'll have to get a better antenna. FCC rules don't allow AM HD stations to transmit second or third audio channels. And, finally, the display information on this and all HD Radio receivers is dependent on what is being sent on the data stream by the station.

The HD-100 works well as a table-top or bedside radio, letting you tune into local HD channels (provided you have a good enough antenna) and second or third audio channels. You can also use it on your desk-top to catch your favorite Internet radio stations.

No one is going to confuse the HD-100 with its high ticket competitors selling at two, three, and four times the price of the HD-100. But, this radio provides newcomers to HD Radio with the chance to see what all the buzz is about.

The Radioscopy HD-100 retails for \$99.95 (plus shipping) directly from the Radioscopy web site: www.radioscopy.com or call 800-4HD-RADIO (443-7234). For a complete list of HD radio stations in your state, go to www.hdradio.com and click on "find stations in your area." This takes you to a map of the U.S. where you'll click on your state. The list changes frequently, so be sure to check back often. Keep in mind that the list is very optimistic as it lists all stations that have signed up for iBiquity's HD Radio system, whether or not they actually have the transmitters – let alone are transmitting in HD Radio or have second or third channels.

Digital Digest continued from page 31

clear and or easily decodable. Their modems use a characteristic lead-in of:

####0123456789 or
^ ^

Frequencies:

3065, 3372.5, 4055, 4070, 4400, 4465, 4515, 4722, 4865, 5116, 5255, 5400, 5417.5, 6895, 7720, 8230, 9004.5, 9148.5, 9334, 14740, 19105, 18305kHz USB

That's it for this month. Enjoy your decoding and keep the letters and questions coming.

RESOURCES

RFSM2400 Mirror Site - rfsm2400.aanesland.com

Hoka Decoders - www.hoka.net

WaveCom Decoders - www.wavecom.ch

SkySweeper Decoders - www.skysweep.com

110A Serial Tone Audio - www.signals.taunus.de/WAV/MIL188-110A.HTML

110A 16 Tone Audio - www.signals.taunus.de/WAV/MIL188-110A_AppA.HTML

110A 39 Tone Audio - www.signals.taunus.de/WAV/MIL188-110A_AppB.WAV

141A ALE Audio - www.signals.taunus.de/WAV/MIL188-141A_ALE.HTML

Tadiran ALE Audio - www.signals.taunus.de/WAV/TADIRAN-AUTOCALL.WAV

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RadarBox by AirNav Systems

Decoding the New ADS-B Aircraft Communications System

By John Catalano

If you have done any aircraft tracking using the ACARS (Aircraft Communication Addressing and Reporting System) signal from your receiver, or even just using an Internet connection, you probably know the name AirNav Systems. Over the years the *Computers & Radio* column in *MT* has covered a number of their products including AirNav ACARS Decoder, AirNav Suite and Live Flight Tracker.

AirNav System was the first company that I know of to produce a product that allowed the user to process and display their off-air ACARS intercept data along with intercept data from others via the Internet. RadarBox takes this concept one step further with very interesting results. This new product builds on the recent introduction of a new type of aircraft reporting system call ADS-B.

ADS-B enables Air Traffic Control and pilots a real-time "global" view of the air traffic patterns by providing a more precise and much wider area of coverage than normal radar.

Radar

Radar is an acronym for Radio Detection and Ranging. It was developed in the United Kingdom in the 1930s as an offshoot of a failed program that attempted to disable aircraft using high power radio waves.

Radar transmits a pulse of radio waves and then listens. What's it listening for? When a radio wave hits an object, especially a metal object, a portion of the signal is reflected back off the object. Think of light reflecting from a mirror or a piece of glass.

The radar system listens for this return reflection signal and then calculates the position and velocity of the object. As we can see, the transmitter power, near line-of-sight signal propagation, "reflect-ability" of the target, and the radar receiver's sensitivity all combine to limit the resulting range and accuracy. Therefore, air traffic radar is very limited in range to usually less than 50 miles and has problems with low flying aircraft.

Since the late 1970s, another system has also been used by ATC (air traffic control) that does not rely on a passive reflective signal. Instead, all aircraft are required to have on board a transponder operating at 1030 MHz. In operation ATC transmits "interrogation" pulses. Once the aircraft's transponder receives this signal, it responds by transmitting a signal back to ATC.

I happened to be piloting an aircraft in the

New York Terminal Control Area (TCA) the day encoding altimeter transponders became mandatory to enter TCA airspace. That day was a mess, with lots of aircraft being denied entry into the airspace, resulting in rerouting and chaos. However, by day three, everything was back to normal.

This was a major improvement to the ATC capability for two reasons. One, since the aircraft actually transmitted a return signal, weak reflection signals no longer limited the system. But even better, using an encoding altimeter, the aircraft's transmitted signal was digitally encoded with its altitude. This 1970s system ushered ATC into the digital data age.

Building upon the use of digital data, many other ATC system developments have been implanted since the introduction of transponders thirty years ago. RadarBox utilizes the latest, ADS-B.

A New "Radar"

Automatic Dependent Surveillance Broadcast type B, ADS-B, was a concept developed around 2000 to be a low cost replacement for radar. In addition to being lower cost, ADS-B provides the aircraft community many other benefits.

Still centered around 1000 MHz, over the years the system has been tested at frequencies of 978 MHz for general aviation and 1090 MHz for commercial aircraft. The standards seem to

still be in flux. Early this year Raytheon proposed to the FAA (Federal Aviation Authority) a single 1090 MHz system for all aircraft.

Think of this system as the 21st century transponder system. The ADS-B signal incorporates on-board GPS generated exact position, as well as speed, heading, altitude and flight number and other aircraft specific data.

ATC, as well as other aircraft in the air and on the ground can receive this in-flight ADS-B signal and instantly decode all the information. Even satellites can get in on the action and receive and decode ADS-B signals.

So Can RadarBox!

RadarBox from AirNav Systems consists of a 12 inch long whip antenna, a small 5 x 4 x 0.75 inch metal box, a USB cable and a CD containing the control program. The metal box houses the 1000 MHz receiver and the data decoder hardware and connects to the PC via a supplied USB cable. Connecting the hardware could not be easier.



PC Requirement

AirNav Systems gives the minimum system requirements as Microsoft Windows, 400

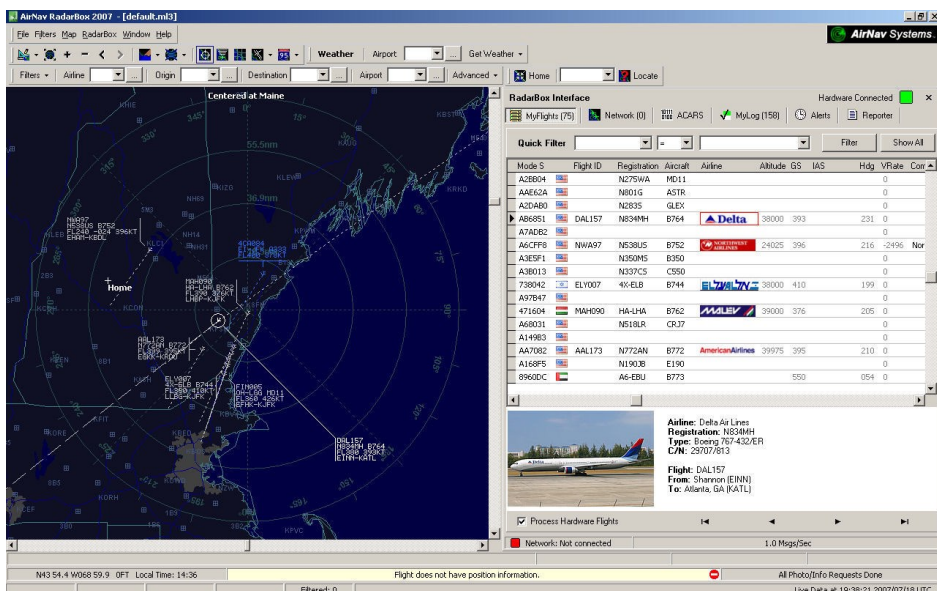


Figure 1 – RadarBox's main map and interface screens shown together

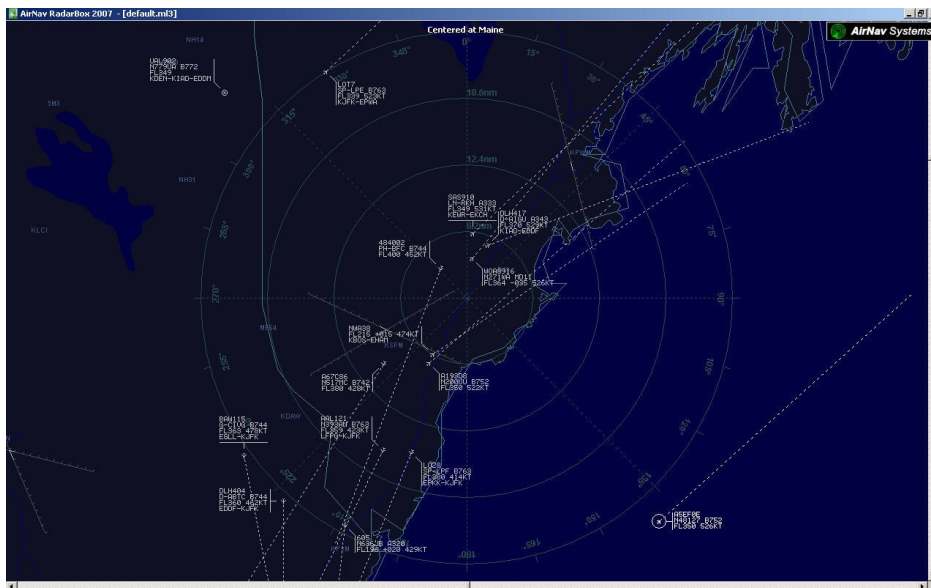


Figure 2 – Full screen map display showing aircraft coming from Europe and going to Europe over the state of Maine and over the Atlantic!

MHz processor, 128 MB RAM, 50 MB hard drive space and CD-ROM drive. Curiously, no Windows or CPU types are specified. We ran it on a PC with a 1.6 GHz Duo Core T2060 CPU, 1.4GB of RAM with a Vista Home Basic operating system. It was very well behaved.

Installation - Careful

Trained as a scientist, I always follow printed directions ... to start. The "Quick Installation Guide" printed on the CD cover has the user connecting the box to the PC via the USB before installing its hardware driver or control program. I dutifully followed this and ran into problems!

However, the excellent detailed instructions, which are available on the CD in the "Manual" folder, warns, "**DO NOT CONNECT THE HARDWARE USB CABLE TO YOUR COMPUTER BEFORE INSTALLING THE SOFTWARE.**" Following the instruction on the CD resulted in a quick, easy, and painless installation. The program was up and running within a minute.

Running RadarBox

RadarBox really has two main screens: a map screen and an interface screen. The map screen takes the decoded positional data of each aircraft and displays it on a map. The map contains over one million location details. The interface screen lists the time of each aircraft ADS-B signal intercepted, along with flight number, aircraft registration number, aircraft type, altitude, ground speed, indicated airspeed, heading company name, route, where it's flying over, vertical rate, and longitude and latitude. As you'll soon see, not all aircraft will broadcast all data fields.

Let's start by looking at a simple RadarBox display. Here, in Figure 1, the two screens, map and interface, are presented together. On the left is the map screen where we can track the aircraft whose ADS-B signal RadarBox was received.

Here we can see the outline of the coast of Maine, New Hampshire, and Massachusetts at the right. Boston appears as a lighter gray area in the lower part of the map. The northernmost tip of Cape Cod can be seen at the very bottom right. OK, now that we are geographically oriented, what can RadarBox show us?

On the right side of Figure 1 is the Interface screen displaying line readouts of the data obtained from each airline's transmission received.

Looking back at the map, we can see that one aircraft symbol has a circle round it. This corresponds to the line entry on the Interface screen that we have selected using the mouse. From the arrowhead seen at the left side of the interface screen and the box around "Delta," we see this circle is a Delta airlines flight DAL157. Also from this line we can tell that it is a Boeing 764 aircraft, flying at 38000 feet, with a ground

speed of 393 and a heading of 231 degrees.

The line on the interface screen can be scrolled to the right to display more flight data. If available from an on-line site, a picture of the exact aircraft is displayed at the bottom of the interface screen. In Figure 1 we can see the aircraft, registration (tail) number N834MH. To the right of the picture is route information that indicates that this flight originated in Shannon, Ireland, and is en-route for a landing in Atlanta, Georgia.

Remember, all this info has been gleaned from radio reception of a quick spurt of data from an aircraft over 80 miles away. Pretty amazing stuff!

Going back to the map at the end of the solid line, which extends from the circled aircraft to the lower right (over the ocean), we can see the flight number, DAL 157, and a summary of the line data. This aircraft symbol also has a dotted line extending through it roughly going from upper right (Northeast) of the map to the lower left (Southwest) showing its flight path.

Get'em All

Looking carefully at Figure 1 we can see that six additional aircraft are visible. If the user places the cursor over an aircraft symbol, RadarBox will immediately locate that aircraft's information on the Interface screen by moving the arrowhead indicator to that aircraft. AirNav Systems has created a very, very nice user interface.

Using the Command line at the top of Figure 1, the map can be customized by color, and can display radar distance rings and expected maximum received signal range lines. In addition, a whole myriad of aviation and general symbols can be displayed on the map including airports, radio navigational beacons, roads, railroads and many more.

Filtering the Data

If the user is only interested in tracking specific aircraft, RadarBox includes a com-

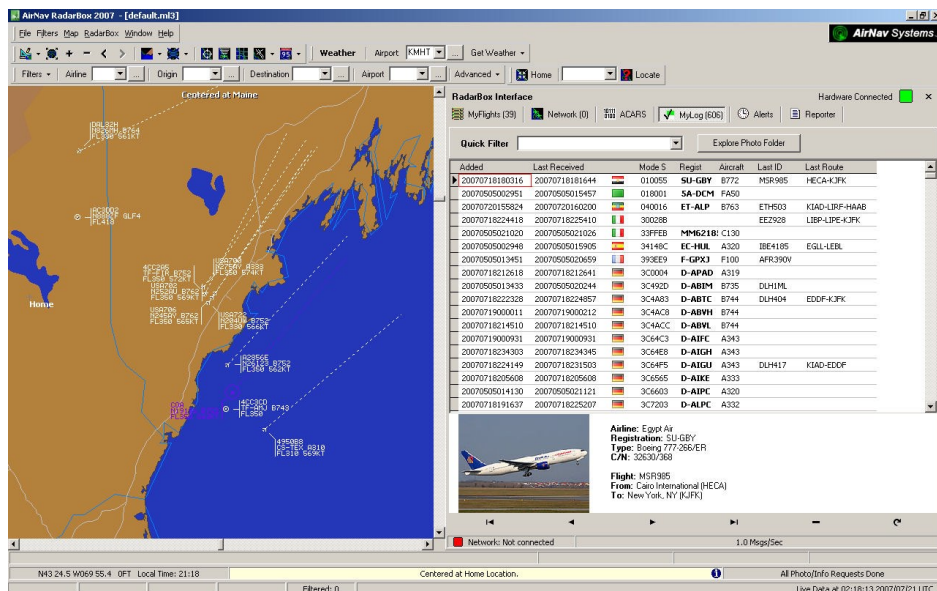


Figure 3 – Some of the 606 logged aircraft displayed on the right. Also a different map view and color scheme on left. Taken at a different time than figures 1 & 2.

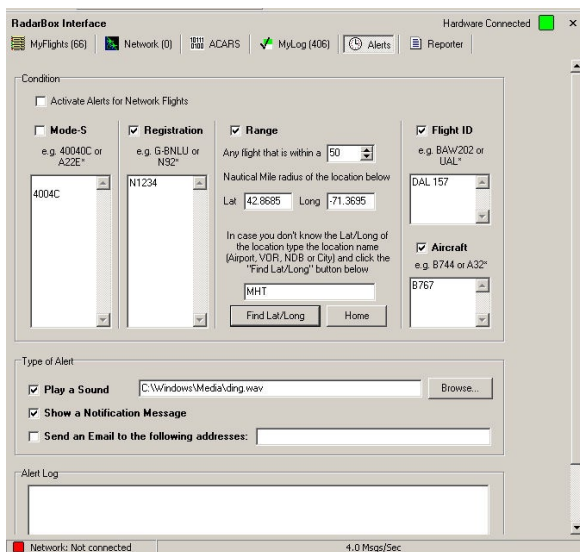


Figure 4 – The very useful “Alert” setting screen.

prehensive, but easy to use array of filtering routines. These can be accessed in a number of ways. The simplest is via the three (currently empty) boxes which sit at the top right in Figure 1 labeled Airlines, Origin and Destination. For example, if these were set to DAL, JFK and LAX, only Delta flights originating at Kennedy Airport in NY and flying to Los Angeles would be displayed. This is a very important and useful feature for commercial airline applications.

The screen can also be used to filter the displayed aircraft using a similar method, but using the information found in the columns on the interface screen, such as altitude and registration number. Multiple custom filters can be stored and easily retrieved for later use.

For simplicity, Figure 1 was created without any filtering. And in my location in the boons of New Hampshire, that was necessary to obtain a visually interesting display.

Actually, two factors resulted in my low volume of received traffic. One was my quiet rural location 40 miles from any airport and 60 miles from a major airport. The second was the indoor whip antenna. When you consider that all the signals were received by this little whip sitting on my desk on the ground floor of a three-story house, that’s a pretty hot receiver in the little RadarBox!

Europe – Both Ways

The highest air traffic volume that RadarBox received from my location using the indoor whip is shown in Figure 2. Here we have expanded the map display to full screen. From the direction of tiny aircraft symbols and their flight path lines, about half of these aircraft are European flights making US landfall in Northern Maine. Most of the others are US flights with transatlantic destinations.

RadarBox DX

Take a look at the extreme right of Figure 2. That is an aircraft out over the Atlantic whose ADS-B signal RadarBox received and decoded. The distance from the location of the RadarBox’s little whip antenna (off the screen

to the northeast) to this aircraft cruising at 35,000 feet, is a surprising 80 miles!

What will an outside antenna do? Well, even if the coax attenuation at 1000 MHz does reduce the signal, reception may be quite good in my rural location. Let’s keep that comparison for a future *Computers & Radio* column.

Logging Aircraft

When an aircraft’s data is decoded and displayed on the interface screen, it is also automatically entered into a log file called My Log. This file is accessed from Commands above the line entries on the Interface screen. Notice that the “My Log (606)” is selected. The right side of Figure 3 displays the first group of the 606 entries in the My Log. Scrolling allows

access to all log entries.

Also notice that the left side of Figure 3 shows a different map color scheme. This map was taken at a different time from Figure 1 & 2, and therefore does not display the same data.

Saving Your Efforts

The program includes two simple ways of saving your intercepts. The first actually makes a recoding of the all screen activity from the time the user starts it until he stops it. When a recorder file is played back, the programs acts as if it is live signal data. This feature works great and is easy to use from the File menu in the Command line located at top left of Figure 1.

If you just want an image file of an interesting map screen, the “Screen Shot” function, found in the same File Menu, will do the job. These applications work great and are a pleasure to use.

Yet Another Filter

The “Alerts” function accessible from the top of the Interface screen, Figure 1, provides another filter of sorts. The user can set five types of alert conditions. Clicking on the Alerts function opens the screen shown in Figure 4. Alerts are generated when a user-defined mode-S is received, aircraft registration is decoded, and/or an aircraft is within a user prescribed distance.

If an aircraft transmission is decoded which meets any of these conditions, a sound is played and a box appears with the aircraft’s flight data. No matter what other application you are running, the Alert box appears.

Additional Features

For this review, we have used just RadarBox in the off-air mode; that is, using the output of the receiver. However, RadarBox can also utilize an AirNav Systems server network to provide in-flight aircraft data from all other users. The price of RadarBox includes a one-year subscription to this server network. However,

after the first year it will cost the user \$240 per year to access this network feature.

Looking at the top right of Figure 1 you’ll notice the word “Weather.” If the user enters the name of an airport in the box to the right of “Weather” – for example, Manchester – the current weather for that airport will be displayed. The program even gives you three choices of display format: METAR, TAF and decoder METAR.

Unanswered Questions

I had unexplained situations having to do with the USB and Signal lights on the “box.” The blue USB light is continuously blinking, but in a seemingly random pattern. Also the white signal light flashes at times with neither screen showing any activity. Perhaps this just indicates an update of existing display data. Neither appeared to result in an operational problem.

Summary

Although we touched on the major features of RadarBox, we could not cover them all. For example, RadarBox also decodes ACARS. You can check them out on the AirNav Systems website at www.airnavsystems.com/RadarBox/index.html

I found using RadarBox in the off-air mode easy to use and very enjoyable. Every feature that I tried worked as advertised. It is an excellent product.

At \$899, almost \$900, this is the most expensive software package that I have reviewed. But remember, RadarBox is not simply a decoder program. It is a complete system from antenna to 1000 MHz receiver to hardware decoder to control software. And it utilizes a newly introduced communications technology.

Perhaps AirNav System’s next product should be a lower cost ADS-B decoder that utilizes our existing scanners and receivers capable of 1000 MHz. However, the data pick off from the receiver could not simply be via the audio. It would probably require the owner to find and connect to a point in the receiver’s circuit. With most receivers utilizing tiny surface mounted device (SMD) construction, this approach would definitely not be for everyone. But it would allow lower cost decoding of the newly emerging ADS-B traffic for those of us with a steady hand and SMD experience.

Today, AirNav Systems at www.airnavsystems.com/RadarBox/index.html and Kinetic Avionics Products www.kinetic-avionics.co.uk/sbs-1.php are the only two companies currently marketing ADS-B decoding products to our non-commercial market. AirNav’s comparison of the two systems is available at www.airnavsystems.com/forum/index.php?topic=54.0.

My experience with RadarBox can be summed up with one word – Great! If you need/want to monitor the ADS-B mode, and you are willing to spend \$900, then RadarBox, is for you.

There is no question that we are witnessing the dawning of a new era of aircraft communications and control.

Junk Box Treasures: Shafts

By Carl Herbert, AA2JZ

Variable capacitors are one of the parts often required in your latest “home-brew” project. But many of the capacitors either from your junk box or available at hamfests are the sort which have no tuning shaft. While the appearance and value of the part are acceptable, the lack of a shaft for tuning makes the item useless.

Of course, my collection of “variables” follows that same theme – some having the correct value (or “close enough”), but none having a suitable shaft for tuning.

Here’s how to remedy that problem and reclaim those variables for front panel use.

Replacement variable volume controls from your local Radio Shack® are provided with an extra long 1/4-inch-diameter control shaft, which is cut to length when installed. This provides a remnant aluminum shaft of about 3 inches. Naturally, being a pack rat, I haven’t thrown any of these trimmings away. Therefore, I have a few in my inventory just waiting for their purpose to be discovered.

For those without leftovers, aluminum rods are also available from your local home-building supply. Steel rods of the same size are also usable, just more difficult to work with. Try using maple doweling; it works well, also, and it’s an insulator to boot.

While shopping at the home building supply store, look for an assortment of “roll pins.” An assortment of pins ranging from 1/16 inch or greater will suffice. Roll pins are formed from sheet metal, either steel or alumi-

num. They are curled around a device to create a long round pin, having an open slot along the longest side. These act as a pressed-in spring device, providing a “friction grip” on the two units being attached.

Lacking those, finishing nails can also be put to good use for this project.

❖ Be a Joiner

To begin the project, a suitable hole must be drilled into the end of the quarter-inch shaft to be used as the tuning control. It’s better to practice on the replacement rods first, before trying the same process on your valuable capacitor.

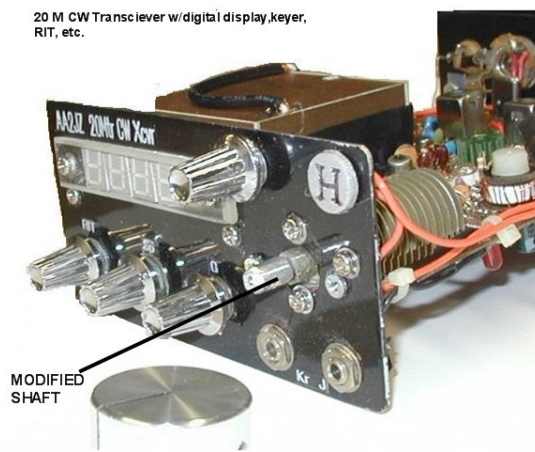
File the end of the rod flat (if it isn’t already), and place the rod in your drill press vise, flat end up. Lacking a drill press vise, locking pliers and a “C” clamp have been used to perform this task. It just takes a little more “juggling” to get the rod perpendicular.

Center tap the end of the rod and drill a 7/32 inch hole about 1/4-inch deep into the shaft. Drill SLOWLY, and insure that you’re drilling straight into the center of the shaft.

Having completed the rod, it’s time for the capacitor. The same process applies. Take care when placing the ceramic form of the capacitor in the drill press vise or locking pliers. *Too much pressure will fracture the ceramic and destroy the capacitor! Drill SLOWLY*, the capacitor is a gentle beast, and won’t absorb much punishment. I used a cotton cloth around the ceramic form to provide a soft buffer, and just enough pressure on the vise to hold the capacitor in a vertical position.

Once the holes are finished, it’s time for the attachment phase. The roll pin or the finishing nail is now put to use. If you’re using roll pins, grip one near its end, compressing the two sides slightly together. Gently force the end of the pin into the hole you made in the end of the capacitor shaft. If all

20 M CW Transceiver w/digital display, keyer, RIT, etc.



goes well, you should be able to GENTLY tap the pin deeper into the hole. A similar action attaches the shaft to the protruding roll pin from the capacitor. Roll pins come in various lengths; trimming the pin to an appropriate length maybe required. Just be careful when cutting away the excess length, and file away the burr left by the cutting process. A scant drop of super adhesive or epoxy can be applied if you desire.

Using a finishing nail also works. The 7/32 inch hole readily accepts a finishing nail of appropriate size. Use a SCANT drop of adhesive to secure the nail into the hole. The same process applies to both ends. “Dry fit” the nail in the holes, and mark the length needed to make a flush fit between the capacitor and new shaft. Trim and dress the nail accordingly.

When using the adhesive/nail method, I keep the capacitor in the vise (or pliers) pointing upwards, untouched, until the adhesive has had time to cure. Doing this will aid in keeping the new shaft aligned properly to the capacitor.

❖ No Longer Junk

And there you have it! More variables with shafts than you had before. I haven’t tried this process using my hobby rotary tool and bench vise, but I would suspect that with diligence and care, the same results would be gained. I have found variable capacitors at hamfests that lack shafts to be much cheaper than that of their long tailed cousins.

Besides, wouldn’t it be nice to be able to use those “orphans” in your junk box for more than just potential “inventory”?!

TYPICAL “SHAFT-LESS” VARIABLE CAPACITOR



Windows Vista Versus Radio Programs

OK. So you've taken the plunge and treated yourself to a new laptop computer. Look at that huge, beautiful LCD screen. It has a DVD/CD reader and double layer writer. Great audio. Network interface and audio modem for network and Internet connections. And finally, all this is run under a new operating system, Vista. There is so much power in this thin, lightweight package.

Now look a bit closer. Something's missing.

Look around the computer. You probably can find lots of USB ports. But do you see a printer (parallel) port? No. Well, not really a problem for computer and radio users. Most radio control programs use a serial port for their connection. Whoops ...no serial port?!

Now what? Return this great piece of computing hardware? The alternative is to give up using computers with your radios. Unthinkable! So ... now what?

❖ Lots of Questions

I had heard a lot about USB to serial converters. But how much did they cost? Do they work with our radio programs? Will they work under Windows Vista? For that matter, will the radio programs run under Vista? This month we'll try to answer some of these questions for a few radio programs. Let's start by finding a USB to serial converter.

❖ Hunting the Hardware

One place that I usually start a quest such as this is at www.Cyberguys.com. A look through Cyberguys' catalogue or website and you'll see an amazing assortment of computer related items. You name it and it is probably at Cyberguys.

So, it was at Cyberguys that I found the Mini USB 1.1 Docking Station VDS-1003: Cyberguys item number 104 0524. This small box promised to provide not only a serial port, but a printer (parallel) port and PS2 connections as well, all from a USB connection.

The price was a mere \$29.95 plus shipping. But would it work with Vista and with our radio programs?

❖ Installing the Converter

Within a few days I had this little device connected to my new serial-less laptop. It installed easily in a few minutes under Vista. The new Windows OS driver had passed its first test by identifying the new serial port and designating it Com 5.

However, I found that, depending upon which of the four USB ports I used on my Toshiba laptop, the serial com port number varied from Com 4 to Com 7. Since many programs can only be used with Com 1 to 4, I suggest you map out your USB ports and find one that results in the Com 1 to 4 range. Using the Windows Device Manager in the Control Panel screen, you can view this number by clicking on the "Ports (COM & LPT)" listing. On the other hand, we were surprised to find that many of the radio programs we tried worked with serial ports higher than 4 without any problems.

Thus, the first critical item on the path to making this new laptop work with radio programs was achieved. We still had to answer key questions. Could/would the radio programs be capable of using this type of serial port? And then there was the lingering question, would the program work at all under Vista?

❖ First on the "List"

Eleven programs, which use the serial port for radio control, were installed on the Vista laptop. You may recognize these programs since they were all previously reviewed here in *Computers & Radio*. At that time each was found to work well under Windows 98SE and a conventional serial port. But how would they work using Vista and our USB to serial converter?

For these tests, we ran the radio programs on a laptop with a 1.6 GHz Duo Core T2060 CPU, 1.4GB of RAM with a Vista Home Basic operating system. As we said above, the VDS-1003 USB mini docking port was connected via a USB port.

For most of these tests an ICOM IC-PCR1000 was used as the receiver. In a few, where the program did not support the 1000, an ICOM R7000 was used. Finally, it should be stated that these tests were cursory in nature and therefore do not represent an exhaustive testing procedure. Instead they were a simple "go, no-go" first look. That said, let's dig into the radio programs.

ICOM IC-PCR1000 V2.2

We decided to start with the stock ICOM program, which comes with the PCR1000 and is available for free download from the ICOM site. Notice at the bottom of Figure 1 that program's Coms Port Setting recognized that the radio was connected to COM 5. After verifying that the program installed and opened under Vista, the capability of operating above COM 4 was an added bonus. Version 2.2 worked very well in our laptop system; a very encouraging start.

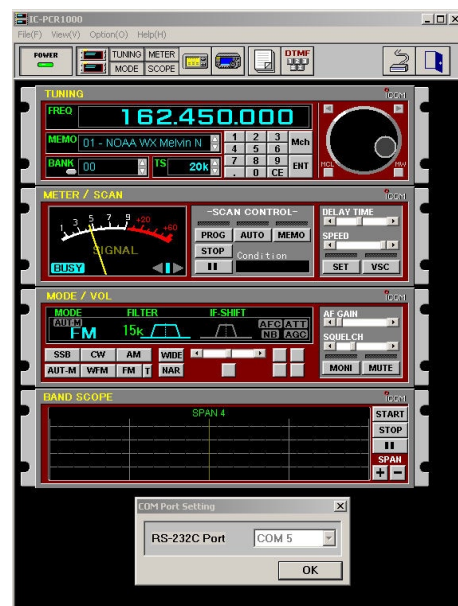


Figure 1 - ICOM's IC-PCR1000 program finding COM 5 port and working fine under Vista

RadioMax v5.17

Anyone who regularly reads this column knows that this program has been a favorite of mine for over a decade. So I was anxious to see how this oldie but goodie would react in this environment. Surprisingly, it worked quite well. As you can see in Figure 2, RadioMax's Serial Port Configuration screen allows the user to select COM 5, the location of our USB/Serial port. Once the correct port was selected, RadioMax worked without a problem.

I'm still not sure if it was my imagination, but it seemed that the response to mouse commands seemed slower than under Win96SE. But the program's major functions seemed to work great. RadioMax is available for \$45 from www.

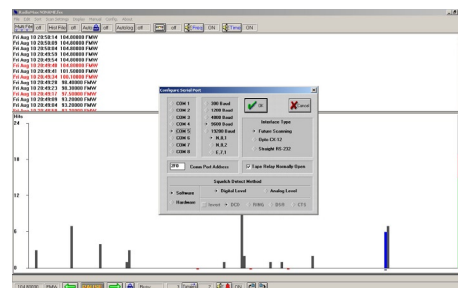


Figure 2 - RadioMax holding its own using Vista & USB/Serial Converter

Talk PCR V 2.4F2

This very popular PCR1000 program chugged along perfectly using Vista and our serial converter hardware. Again, as with RadioMax, the mouse sensitivity seemed a bit strange. The program did hang once during shutdown and had to be closed by Vista. But overall it was quite usable with the PCR1000. This freeware program is available at www.mahy.demon.co.uk/talkpcr/talk-pcr.htm

RxPlus v 1.94

All receiver control functions of this very capable program worked well. As you can see in Figure 3, "Other" was selected on the Configuration display. Then "5" was entered in the space on the right. That's all it takes to get RxPlus working in our Vista/USB to Serial converter system.

The Audio Processing functions seemed to work in our simple testing. However, program shutdown was a problem on one occasion. Again, nothing that Vista couldn't handle. The strange

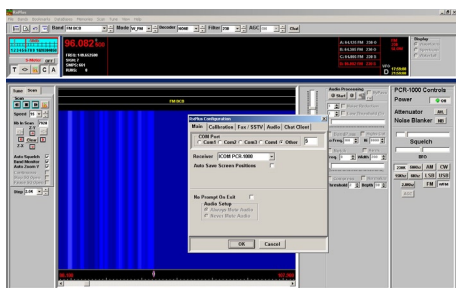


Figure 3 – RxPlus's main screen with its configuration display indicating Com Port as "Other 5"

shutdown had no apparent ill effects on the system or the program. RxPlus can be found at <http://teledata.qc.ca/RxPlus> Currently registration costs \$49.99.

YPLog v4.48

This small-display, simple-to-use radio control program worked very well controlling my R7000. I knew that YPLog would do the job once I opened its port configuration screen and found a choice of twelve (12!) com ports to choose from! As expected, YPLog ran without a problem. This shareware program can be found at www.qsl.net/ve6yp/index.html Due to a number of bugs in version 4.49, the author recommends that 4.48 be used instead.

Rig Resident v1.1

Another small-screened, simple-to-use radio control program, Rig Resident worked well for control of a R7000 under Vista and the USB/Serial converter. This freeware/beta program is available at www.dxshell.com/soft/rr.html

Ham Radio Deluxe v3.4 b1254

Although only the radio control part of this suite of programs was used extensively, all functions seemed to work equally well. In fact, as seen in Figure 4, the program automatically identified the connected PCR1000. Then the program set its radio control port to COM 5. Very nice! As the

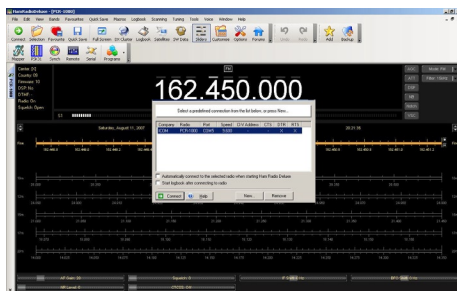


Figure 4 – Ham Radio Deluxe taking it all in stride!

website says "HRD is free for Radio Amateurs, Shortwave Listener (SWLs) and charitable organizations." Ham radio Deluxe can be found at <http://hrd.ham-radio.ch/>

Radio Raft 3.21

This program started fine. At its second install screen, it asks the user to choose a serial port. Previously we had plugged the converter into the USB port, which resulted in a COM 4 serial port. Good thing, since the program's choices were limited to 1 thru 4. So far so good, or did I speak too soon?

The main screen was then displayed, BUT the program was frozen! Neither keyboard nor cursor commands resulted in any activity. The clock on the program's main screen was stuck on 00:00:00. When I tried to close the program, the "blue screen of death" appeared. My computer had crashed!

Was it a Vista problem, a serial port problem, or both? On its website <http://radioraft.free.fr/> it states, "RadioRaft is not compatible with Windows 2000 or XP." I guess this applies to Vista as well.

ICOM OKA V1.0

This freeware program, which controls ICOM radios, loaded and seemed to run under Vista, controlling the R7000. This is another program that does not have COM port capabilities higher than COM 4. Even though the converter's serial port was at COM 4, the program sometimes had problems accessing it. Instead, it reported the radio on COM 2. Lots of unanswered questions remain with this program using Vista and the converter. You can get a copy at www.honeysw.com/

HamPort v1.0 Beta

This total failure was unexpected. It uses the Omni-rig radio control engine as do a few of the other programs we operated successfully. Boy, Vista really did not like this program! This Freeware program is available at www.dxsoft.com/en/products/hamport/#bottom

DX Monitor V1.20

This program seemed to run fine under Vista even though it has the Omni-Rig control engine, as in the non-Vista-working Hamport above. However, although the Internet cluster features performed very well and the COM 5 was possible, only Ham transceivers are supported. Therefore, rig control was not exercised. But all functions appeared to work well. The 30 day evaluation version is at www.benlo.com/dxmon.html

Decision on the Interface

The verdict on the USB to Serial converter from www.Cyberguys.com is a resounding – YES!! It worked perfectly. I think it's a real deal at \$29.95: that's \$10 for each new port. I did try the printer port with a printer and it worked without a problem. If you order one, tell Cyberguys that you saw it in *Monitoring Times*.

Keeping Score

So, the score to date is eight programs out of eleven worked using Vista and our USB to Serial interface. In fact, these appeared to work quite well. Two programs tripped over Vista and would not run. Clearly these contain code that is not Vista compatible. And finally, one program seemed to work in Vista, but unfortunately exhibited some erratic serial port operation.

Please remember, our tests were cursory at best. So if any reader has more information on these programs running under Vista please pass it along.

I will continue to compile a chart of programs tested under Vista (and using the converter) and will include it in this column periodically. See Figure 5 for the first of these "Radio Programs Running Under Vista" charts. Till next time when we'll continue to explore new radio vistas... (ouch!)

RADIO PROGRAMS WHICH RUN IN VISTA AND INTERFACE TO USB/SERIAL CONVERTER

PROGRAM	VERSION	VISTA?	CONVERT	COMMENTS
DX Monitor	1.20	YES	YES	Actual rig control not performed since only transceivers supported
Ham Radio Deluxe	3.4 build1254	YES	YES	Tested functions worked well
HamPort	1.0 Beta	NO	?	Would not run in Vista
ICOMIC-PCR1000	2.2	YES	YES	Worked well
ICOM OKA	1.0	YES	YES?	Erratic Program/Port Behavior
Radio Raft	3.21	NO	NO	Crashed PC
RadioMax	5.17	YES	YES	Worked Well. Mouse ops seems overly sensitive
Rig Resident	1.1	YES	YES	Worked well
RxPlus	1.94	YES	YES	Worked Well. Audio Processing Not Tested. One Shutdown Glitch
Talk PCR	2.4F2	YES	YES	Worked Well. Mouse ops seems overly sensitive
YPLog	4.48	YES	YES	Worked well

as of 081207

USB to Serial Converter is a Mini USB 1.1 Docking Station VDS-1003. Cyberguys.com item number 104 0524.

Figure 5 – Chart of radio programs running under Vista & successfully interfacing to USB/Serial Converter – The first eleven entries.

What's NEW

Tell them you saw it in Monitoring Times

GRE Demonstrates New Radios

Monitoring Times and Grove Enterprises spent a thoroughly enjoyable morning with the GRE team in early August. They brought with them the new GRE line of scanners: The PS-100, 300, and 500 are handheld scanners, and the '200, '400, and '600 are the corresponding desktop/mobile models.

GRE's intent in producing these new radios is to reduce the frustration level when it comes to setting up and using scanners, even when programming a mix of conventional and sophisticated digital radio systems. No matter what kind of system or operation you are setting up or monitoring, all basic data entry, browsing, and control functions work the same. The user interface is designed to be intuitive and common to most functions.

The main innovation to help simplify scanner programming is GRE's "Object Oriented" approach, in which each data entry is an "object" which can be organized or manipulated as you wish. You are not limited to traditional bank/channel memory layouts, and scans are not limited by the number or types of "objects" in a scan list. The main memory can store over 1800 "objects" (conventional channels, trunking talkgroups, search configurations, etc.).

Although each of the radios can lay claim to a particular strength or defining feature, the radio causing the most excitement in the scanning community is the **PS-500** handheld/**PS-600** mobile analog/digital scanner line. Watch for a full review in *MT* in the November or December issue. Meanwhile, here are a few of the published specifications:

- **Frequency Coverage:** 25.000-54.000 MHz, 108.0000-174.0000 MHz, 216.0025-512.0000 MHz, 764.0000-960.0000 MHz (excluding cellular), 1240.000-1300.000 MHz.
- **Menu Driven Programming with Context Sensitive Help** -- Each menu item provides a few lines of help text
- **Upgradeable CPU and DSP Firmware**

• GRE's Exclusive V-Scanner Technology

-- Allows you to save complete radio configurations (different geographical areas, for example) for recall as needed in 21 V-Scanner folders, each capable of storing over 1800 objects.

• **Multi-System Trunking** -- Scan most common trunked system signaling formats, including Motorola, EDACS Standard, EDACS Narrow, LTR and P25 trunked radio networks. Talkgroup call and individual call monitoring are supported. Supports trunking operation in virtually any land mobile band including 700 MHz and the new US DoD 380-390 MHz band.

• **P25 NAC Functionality** -- Much like CTCSS and DCS with analog signals, a P25 Network Access Code (NAC) provides selective squelch operation. Can block transmissions that do not have a matching NAC

• **Subaudible Squelch Decoder** -- CTCSS and DCS subaudible squelch coding. Provides fast and reliable decoding of subaudible squelch signaling with squelch tail elimination.

• **Remote Control Capability** -- Third party application software can remotely control a scanner from a personal computer.

• **Exclusive ALERT LED and audio** -- Programmable tri-color LED can illuminate or flash eight different colors when certain channels are active. Likewise, programmable audible alarms can also be configured to sound when certain objects are active.

• **High Speed PC Interface** -- Uses GRE's 30-3290 USB cable in full duplex mode for PC transfer and radio-to-radio cloning.

• **Spectrum Sweeper** -- Quickly sweeps for transmissions from nearby transmitters.

• **Trunking Control Data Output** -- Streams decoded trunking control data from your PSR-500/600 to a personal computer for use with popular third party trunking control channel monitoring software. No slicer needed. Also streams NOAA weather radio SAME alert data.

• **SAME and All Hazards Weather Alerting** and one-button access to frequencies used by storm spotters.

• **Sleek Compact Case Design** -- Has a large speaker for adequate volume in most environments, and is designed

- for one-handed operation.
- Eleven tuning steps.
- Triple conversion scanner.
- Attenuator (20 dB).
- 55 channels per second scan speed and 90 steps per second search speed.
- Earphone jack (3.5 mm stereo).
- PC Interface/Clone jack (3.5mm stereo).
- Memory Backup: No battery backup required. EEPROM used.
- PSR-500 Accessories: Rubber duck antenna, owners manual, normal battery holder, rechargeable battery holder, belt clip, and USB PC interface cable.
- PSR-600 Accessories: Telescoping antenna, owners manual, mounting bracket, AC adapter, DC cable (with fuse), and USB PC interface cable.

The PS-500 is expected to be in stock in October for \$499.95 from most dealers, including Grove Enterprises. The PS-600 mobile digital trunking scanner, not yet type accepted, is expected to be available in December. For information on other GRE scanners, visit www.greamerica.com or contact Grove Enterprises (800-438-8155 or www.grove-ent.com) or other *MT* advertisers.

World QSL Book

Teak Publishing, a new company owned by Larry and Gayle Van Horn, has published its first book just in time for the fall/winter HF DX season. *World QSL Book*, by Gayle Van Horn, is a comprehensive resource and reference book on CD for any hobbyist who is interested in acquiring a verification of reception of almost any HF station, whether broadcast, utility, amateur radio, or unlicensed pirate or clandestine!

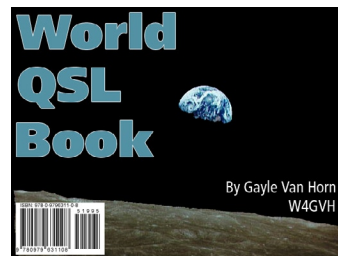
For those new to the hobby, the first 90 pages are devoted to the "how-to's" of QSLing, drawn from Gayle's 30 years of experience. This includes best general practices in logging, reporting, and mailing your report, and then it moves on to address specific recommended practices tailored to each global region.

How do you know where to send the report? Should you try to send a report in a language you don't speak? What should you enclose in your report? How long should you wait for a reply? Should you send a second report? The book answers

these common questions and much more. And lastly, Gayle addresses an often-neglected question: what do you do with your QSL cards and letters after they start to accumulate?

As to *where* to send the report, that is the subject of the remaining 430 or so pages. An astonishing amount of information is contained under logically-organized, easy to follow sections. Each station listing includes mailing address, plus email address, website, and whether the station provides streaming audio. And, being in pdf format, all links are active, so a click will take you directly there if you are connected to the internet.

World QSL Book is published in Adobe Acrobat (PDF) electronic format and is fully searchable and printable. It can be run on any computer platform and uses the Adobe Acrobat reader program (a free internet download). Navigation through the book is made simple by a very comprehensive Table of Contents. Although you cannot go immediately to a topic by clicking on it, if you keep Adobe Acrobat's "Bookmarks" panel open, simply clicking on the desired page number "turns" right to it.



Are you looking for a specific station or country? Another way to navigate is by using Adobe's search engine: Click on the binoculars, type in "Madagascar," and a few seconds later, 26 entries pop up on the search panel. You can pick the one that looks like the one you want, or manually click through each entry.

World QSL Book is available from Teak Publishing, P.O. Box 297, Brasstown, NC 28902, teakpub@brmemc.net for \$19.95 +\$3 shipping in the US (check, money order or Pay Pal). It is also available at the same price from Grove Enterprises (800-438-8155; order@grove-ent.com).

- Reviewed by Rachel Baughn, Editor

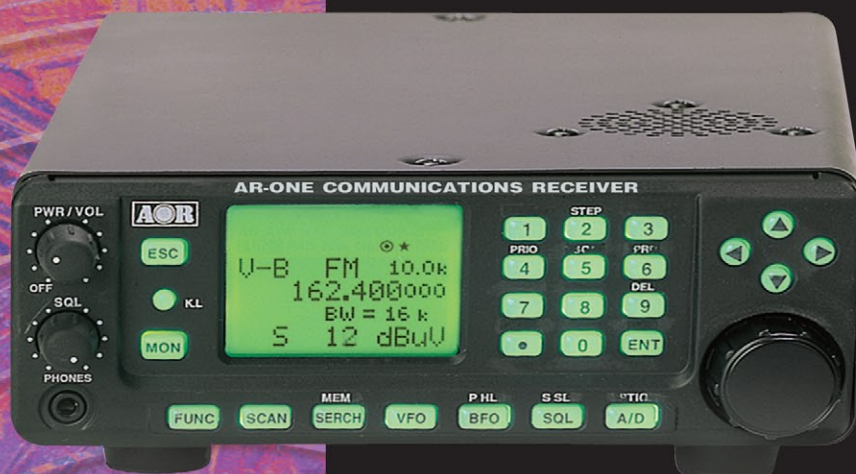


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